

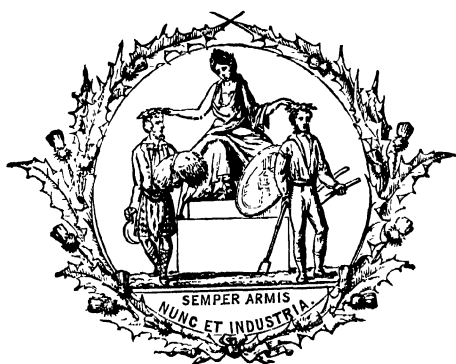


AGRICULTURAL RESEARCH INSTITUTE
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TRANSACTIONS
OF
THE HIGHLAND AND AGRICULTURAL
SOCIETY OF SCOTLAND

WITH
AN ABSTRACT OF THE PROCEEDINGS AT BOARD AND GENERAL
MEETINGS, AND THE PREMIUMS OFFERED BY
THE SOCIETY IN 1912

PUBLISHED ANNUALLY



FIFTH SERIES

VOL. XXIV.

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EDINBURGH:
WILLIAM BLACKWOOD & SONS, 45, GEORGE STREET
AND 37 PATERNOSTER ROW, LONDON

1912

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HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

FOR THE INFORMATION OF MEMBERS ONLY.

REPORT OF THE CONSULTING CHEMIST, ISSUED TO MEMBERS
BY ORDER OF THE DIRECTORS OF THE SOCIETY.

PEAS MEAL CONTAINING GROUND PEA HUSKS.

On January 5, 1912, I received from a member resident in the north of England a sample of peas meal for analysis. My report was as follows:—

	Per cent.
Moisture	7·64
Oil	2·72
*Albuminoids	21·94
Soluble carbohydrates	44·56
Fibre	18·25
†Ash	4·89
	<u>100·00</u>
*Containing nitrogen	3·51
†Containing siliceous matter	1·23

"The fibre is far too high for genuine peas meal. This, along with the microscopical examination of the sample, shows that this meal contains a large addition of ground husks of peas or other leguminous seed."

On receipt of my report the member sent me the small sample on which he bought the meal, together with a post-card and the invoice from the vendor, Mr Thomas Robinson, corn merchant, 28 Lowther Street, Carlisle. The post-card stated, "I have booked you 2 ton of the Indian Grey Pea Meal as per sample at £7 per ton." The invoice stated, "Pea Meal, 2 ton 7/-/-, £14." The small sample on which the meal was bought was somewhat different in colour and appearance from the sample of the bulk, but on analysis it was found to contain 22·12 per cent of fibre. It therefore contained an even larger admixture of ground husk than the sample of the bulk. Genuine peas meal contains about 5 or 6 per cent of fibre, and a meal containing 18 per cent has probably received an addition of at least 25 per cent of ground husks.

The vendor sent no explanation to the member of the excess of husks in this meal, so, after bringing the matter before the Directors, I wrote him on February 13, and asked if he had "any remarks to make or explanation to offer concerning the peculiar nature and composition of this sample of peas meal." No reply to this letter has been received. The member has now returned the meal to the vendor.

(Signed) JAMES HENDRICK.

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TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

THE IRISH EXPERIMENTS.

By Professor JAMES WILSON, Royal College of Science, Dublin.

SINCE the establishment of the Department of Agriculture and Technical Instruction in 1900, a great many experiments on agricultural subjects have been carried out in Ireland. It is now proposed to give some account of such of these as may be of interest and perhaps of use in Scotland.

In the matter of experiments, Ireland was comparatively late in the field, and thus was so far handicapped in the race of agricultural production. But there were advantages in being late, the chief of which lay in the lessons to be learned from countries which had made an earlier start. England and Scotland had already been experimenting with Government means for about ten years, but locally and spasmodically, and with no co-ordinating design having the production of the country as a whole in consideration. Field experiments had been carried out in one corner or another; but, even on the same crops, they were often on different lines, while in many instances the designs of the experiments were changed about from year to year without the changes being justified by previous work and even without the previous work having been properly digested. Consequently such experiments could not be compared the one with the other, nor could they afford a reliable guide for the

rest of the country. At the same time they had indicated roughly and approximately the manurings suitable and unsuitable for certain crops and the dressings to be placed in juxtaposition in order to achieve a striking and instructive educational effect.

The Irish Department was thus in a position to profit by so much of the work already done in England and Scotland, and to avoid some of its more defective features. It was decided that for the crops common to the whole country the experiments should also be common to the whole country: that for each of such crops similar manurial experiments should be carried out in every county in Ireland, and that the same experiments should be continued for some years.

It might be suggested that such a scheme was unwise, unless a perfect and comprehensive experiment could be devised for each crop suitable to every condition of climate, soil, and cultivation. This was not so, however, since the experiments could be modified did the need arise, and, in special cases, amplified and extended in view of local conditions. Luckily, the experiments, as originally devised, required only a few slight alterations in the early years, and such alterations were easily justified by reason of the large number of the experiments. And, after five or six years of annually accumulating evidence, when it was seen that the results, by reason of their regularity and number, were really authoritative so far as the manures experimented with were concerned, the lines in which the original experiments should be developed in future were clearly indicated.

The machinery by which the experiments are worked is as follows: During the winter the county instructors visit farms and farmers and deliver lectures almost daily in their districts. In so doing they discover places suitable for experiments. Then, when spring comes, having arranged with the farmers and having had the manures forwarded to the field, they are present when these are sown; and they have an eye on the crops growing during the summer, and are present again to weigh them and measure them at the proper time in autumn. A full report of the experiments is afterwards sent up to the Department's headquarters in Dublin; and there the reports from all the instructors are collected and collated. Eventually they are sent to the printer, and finally distributed in leaflets, and in the Department's *Journal*, throughout the country.

It ought to be mentioned that instructors are advised that a few experiments in well-chosen places and well looked after are far more valuable than many experiments, the supervision of which cannot be satisfactorily attended to.

THE POTATO EXPERIMENTS.

We shall take the potato-manuring experiments. On reference to the tables on pp. 4 and 5, it will be seen that there are two series of experiments. The first was begun in 1901, and still continues. In 1906, when it was seen that a dressing of 15 tons of dung, 1 cwt. of sulphate of ammonia, 4 cwt. of superphosphate, and 1 cwt. of muriate of potash left the largest profit, another plot was added to test the effect of sulphate of potash against the muriate.

In 1908 it was felt it would then be safe and wise, now that the "best" mixture, so far, was clearly revealed, to start a new series in which, by varying the ingredients applied in that mixture, it should be shown whether it could be improved upon. Having learned the "rough adjustment," the "fine adjustment" was now attempted. But the new series of experiments was begun only in counties which had been experimenting since the earlier years; and the old series was still continued elsewhere, more especially in the counties which had been late in coming into working order, and in which it was felt that the results of the original series were not yet sufficiently known through experiments and demonstrations and through leaflets and lectures. This accounts for the decreasing number of centres under the old series during the last three years and the increasing number under the new.

It will be noticed that sulphate of ammonia is the usual nitrogenous manure used in these experiments. The reason is that, when the experiments were first begun, single manures were not widely known in Ireland—manufacturers' mixtures, known sometimes as "bag" manures, were chiefly in vogue—and sulphate of ammonia was recommended because it was least likely to deteriorate through delay in application or through bad handling.

The tables on pp. 4 and 5 show the results, as regards yields, of the potato-manuring experiments, the first series from 1901 to 1910, and the new series from 1908. The bottom line of each table shows the financial results.

A frequent method of exhibiting the results of experiments financially is to value the yield of each plot separately, and then say that the profits are the differences between the values of the "no-manure" and the manured plots, minus the costs of the manures applied. But this method is misleading. An example will make it clear. A "no-manure" plot of turnips yields, say, 5 tons to the acre. Another plot manured with 10 tons of dung and 4 cwt. of superphosphate yields, say, 20 tons. If the turnips are valued at 10s. a ton, the un-

THE IRISH EXPERIMENTS.

POTATO-MANURING EXPERIMENTS, 1901-1910.

MANURES.		ORIGINAL SERIES.									
YEAR.	NUMBER OF CENTRES.	YIELD.		YIELD.		YIELD.		YIELD.		YIELD.	
		15 tons		20 tons		15 tons		15 tons		15 tons	
		Saleable.	Small.	Saleable.	Small.	Saleable.	Small.	Saleable.	Small.	Saleable.	Small.
Dung	17	3 9 $\frac{1}{2}$	14 $\frac{1}{2}$	9 10 $\frac{1}{2}$	22 $\frac{1}{2}$	9 12 $\frac{1}{2}$	23 $\frac{1}{2}$	10 3 $\frac{1}{2}$	22 $\frac{1}{2}$	10 16 $\frac{1}{2}$	24 $\frac{1}{2}$
Sulphate of ammonia	23	3 4	23	7 9	29	7 11	28	8 4	32	9 1	30
Superphosphate	20	2 19	20	6 15	27	6 18	28	8 1	29	8 16	29
Muriate of potash	32	2 11	21	6 11	25	7 3	27	7 19	30	9 0	29
Sulphate of potash	33	2 11	22	7 14	27	8 10	26	7 4	28	9 18	27
“	37	2 11	21	5 18	23	6 8	29	7 4	32	8 4	34
“	39	2 9	33	6 4	29	6 18	33	8 18	35	8 7	38
“	49	3 5	21	7 8	34	8 5	34	8 14	36	9 17	37
“	32	3 2	22	7 1	28	8 2	28	8 11	31	9 5	34
“	32	3 3	24	6 16	36	7 15	37	8 15	39	9 9	41
Average of the average annual yields		3 0	22	7 13	30	7 14	30	8 9	31	9 5	32 $\frac{1}{2}$
Value per acre, ² saleable at 40s. and small at 20s. a ton		£7 2 0	£15 4 0	£16 16 0	£16 18 0	£16 18 0	£16 18 0	£18 9 0	£20 2 0	£20 2 0	£19 11 0
Estimated cost of production ³		9 16 6	13 8 0	14 10 0	14 6 6	14 6 6	14 6 6	15 1 0	15 12 0	15 12 0	15 11 0
Estimated profit		2 14 6	1 16 0	2 6 0	2 11 6	2 11 6	2 11 6	3 8 0	4 10 0	4 10 0	4 0 0

¹ There is a slight discrepancy between the yields on these plots in the two sets of experiment, due probably to the “small” potatoes being larger in the New Series.

² £2 a ton may be considered a low figure, but the crops are weighed up in autumn, and some allowance must be made for wastage in the pits.

³ Allowance is made for the varying costs of handling varying yields.

POTATO-MANURING EXPERIMENTS, 1901-1910—continued.

MANURES.		NEW SERIES.											
YEAR.	NUMBER OF CENTRES.	15 tons		15 tons		15 tons		15 tons		15 tons		15 tons	
		1 cwt.		1 cwt.		1 cwt.		1 cwt.		1 cwt.		1 cwt.	
		Saleable.	Small.	Saleable.	Small.	Saleable.	Small.	Saleable.	Small.	Saleable.	Small.	Saleable.	Small.
Dung		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
Superphosphate		3 cwt.	1 cwt.	5 cwt.	1 cwt.	4 cwt.	1 cwt.	4 cwt.	1 cwt.	4 cwt.	1 cwt.	4 cwt.	1 cwt.
Muriate of potash		1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.
1901		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1902		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1903		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1904		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1905		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1906		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1907		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1908		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1909		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
1910		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
Average of the average annual yields		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
Value per acre, ² saleable at 40s. and small at 20s. a ton		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
Estimated cost of production ³		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.
Estimated profit		15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.	15 tons	1 cwt.

¹ There is a slight discrepancy between the yields on these plots in the two sets of experiment, due probably to the "small" potatoes being larger in the New Series.

² £2 a ton may be considered a low figure, but the crops are weighed up in autumn, and some allowance must be made for wastage in the pits.

³ Allowance is made for the varying costs of handling varying yield.

manured acre is worth £2, 10s., while the other is worth £10. The increase has been earned by expending £2, 13s.—viz., 10 tons of dung at 4s. a ton, and 4 cwt. of superphosphate at 3s. 3d. a cwt.—nothing being charged for putting these on the land. Therefore the profit is £4, 17s., viz., £10, minus £2, 13s., minus £2, 10s. But the real profit is nothing of the sort. This method of estimation assumes that the crop on the unmanured plot is produced at neither a gain nor a loss, that its value just equals the cost of production; whereas it is really four or five pounds below that amount.

Another method is to take the plot treated most nearly in accord with ordinary practice as the basis of comparison. But here again we may be wrong, since the value of this plot may not be near the cost of production, and any calculation made on this basis may in consequence give a misleading result. Besides, ordinary practice varies much with place and time.

The most satisfactory method is to calculate the true profit or loss upon each plot separately; and this we shall do with as much care as possible. Then we shall be able to compare one plot with another just as well as if we had estimated the “profits” in the usual way. In adopting this method, we need not set down the costs of production for each plot in detail, for then we should overload an article well burdened with figures already. It must be presumed that the costs of the usual labour can be estimated with reasonable accuracy. But, in addition to the ordinary labour, there are other items that need to be taken into account if we are to arrive at satisfactory conclusions. These, and the sums we propose to set against each of them per acre, are as follows:—

Average rent for the average of such land as that experimented upon ¹	£1	5	0
Rates, taxes, and insurance on horses, implements, and crops	0	3	0
Upkeep of implements	0	3	0
Upkeep of fences, roads, drains, &c.	0	2	0
Annual share of an occasional application of lime or other top-dressing	0	5	0
Interest on working capital necessary for tillage operations	0	5	0
General management and business expenses	0	5	0
Proportion to each crop of the cost of horse-keep and workmen's wages when these are necessarily idle	0	2	6

It might be argued that the above estimates do not treat some crops fairly. It might be said, for instance, that a temporary pasture should be charged less for upkeep of implements, interest on working capital, and general management than a root crop. But on most farms pasture is regarded as being

¹ In Ireland, because of the system of land tenure, this item would be rendered “rent plus interest on tenant right.”

equally necessary with roots; and if any distinction were made it could mean no more than a shilling or two of difference. Besides, if a temporary pasture were debited with the advantages it derives from the ploughing and tilling given to root crops, the balance might swing the other way.

In addition to the above items, which must be set down against every crop grown on an ordinary tillage farm following an average rotation of grain, roots, and pasture, before the costs of the usual labour for each crop can be considered, there is one other item which must be mentioned specially, viz., the costs of manures. What proportion of these should be set against the crop to which they are applied? As yet we have no fundamental experiments, and therefore no unanimity on this subject; consequently, in the belief that it is not very wide of the mark, we adopt the scale which charges the crop which is manured with two-thirds of the dung, phosphates, and potash, and the whole of the readily soluble nitrogen; leaving the remainder to the crops which follow.

In estimating crop values, each crop is taken as delivered by the grower into the hands of the merchant or consumer. Potatoes and grain are taken as delivered at the nearest market or railway station, and roots and straw as carted in and stored ready for consumption by stock.

Before leaving the potato experiments, we might be permitted to draw attention to the chief points they bring out—

- (i.) That, on the average, potatoes cannot be grown profitably without manure.
- (ii.) That they can be grown profitably with farmyard manure, but that
- (iii.) The profit is much larger when artificials are added.
- (iv.) According to the first series of experiments the "best" manure was 15 tons of dung, 1 cwt. of sulphate of ammonia, 4 cwt. of superphosphate, and 1 cwt. of muriate of potash.
- (v.) The new series shows that the addition of another hundredweight of sulphate of potash brings another increase of profit.

It must be clearly understood, however, that in these experiments and the results we have drawn from them no account is taken of the question of quality as affected by different manures.

THE TURNIP EXPERIMENTS.

Assuming that the somewhat lengthy discussion of the potato experiments makes the general scheme of the other experiments clear, we need explain only a few points applicable to the turnips and leave the Table of Results (pp. 9-12) to explain

the rest. Turnips, being frequently grown without farmyard manure, have had two sets of experiments from the beginning: one with dung and artificials, the other with artificials alone. Whether it is wise, out of regard for the succeeding crops and the later "condition" of the land, to grow turnips without dung is a question not touched by the experiments. It might be suggested, since the "no-manure" plots at centres where dung has not been applied have given smaller yields, that those centres have been in the habit of depending upon artificials alone, but on that point we have no evidence; and the phenomenon may be due to chance. Besides, "no-manure" plots in the case of turnips are exceedingly fickle. Our valuation of the turnips at 10s. a ton may require justification, as they are frequently valued at a lower figure, and in the Irish Department's own reports their value is set down at 8s. Turnips are not usually sold off a farm unless in restricted markets near towns in which dairy cows are kept. In such cases turnips are very seldom below 10s. a ton, and are usually considerably higher. Such restricted markets, however, are no sure guide for the farmer who must consume his turnips at home. But we have a guide in the price paid for such turnips to be consumed on the land by sheep; and though that price is always stated in a lump sum as so much an acre, it usually works out, when the yield is taken into account, at about 8s. or 9s. a ton. Then, if we consider that our valuation is for the turnips pulled, carted, and delivered at the place where they are to be consumed, the price of 10s. a ton is not too high. Moreover, if we estimate the feeding value of turnips by comparing them with other foods constantly on the market—we can do so by considering the digestible dry matter and the elements composing it in each case—the price we have fixed is confirmed.

It ought to be mentioned that in the Irish experiments "turnips" means swedes in the vast majority of cases. In Ireland swedes are grown with more success than turnips.

As in the case of potatoes, we may sum up the outstanding results of the turnip experiments:—

- (i.) Turnips are grown at a loss without manures.
- (ii.) They may be grown with dung alone, but the profit is not large.
- (iii.) If dung be used, the profits are much increased by an addition of 5 or 6 cwt. of superphosphate. Slag is less effective than superphosphate, and additions of ammonium sulphate and kainit are not repaid in the increase of turnips.
- (iv.) If the future fertility of the land be not considered, very high profits can be got from artificial manures alone—higher even than from a moderate dressing of dung

WITH FARMYARD MANURE.

1 This plot was dropped after 1909.

TURNIP-MANURING EXPERIMENTS, 1901-1910.

WITH FARNYARD MANURE.

MANURES.		NEW SERIES.									
Dung . Superphosphate Basic slag .	YEAR.	NUMBER OF CENTRES.	10 tons 4 cwt. ..	10 tons 5 cwt. ..	10 tons 6 cwt. ..	10 tons 4 cwt. ..	10 tons 5 cwt. ..	10 tons 6 cwt. ..	10 tons 4 cwt. ..	10 tons 5 cwt. ..	10 tons 6 cwt. ..
			YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.
1901 .	.	...	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1902 .	.	...	...	...	...	...	...	...	...	...	...
1903 .	.	...	...	...	...	...	...	...	...	...	...
1904 .	.	...	...	...	...	...	...	...	...	...	...
1905 .	.	...	...	...	...	...	...	...	...	...	...
1906 .	.	...	...	...	...	...	...	...	...	...	...
1907 .	.	...	...	...	...	...	...	...	...	...	...
1908 .	.	13	23 12	24 6	25 8	23 6	23 19	24 4	23 19	24 18	24 3
1909 .	.	39	23 17	25 0	25 0	24 0	24 5	24 18	24 5	24 18	24 3
1910 .	.	41	22 6	23 3	24 4	22 7	23 0	24 3	23 0	24 3	24 8
Average of the average annual yields .			23 5	24 3	24 17	23 4	23 14	24 8	23 14	24 8	24 8
Value per acre .			£11 12 6	£12 1 6	£12 8 6	£11 12 0	£11 17 0	£12 4 0	£11 17 0	£12 4 0	£12 4 0
Cost of production .			8 11 0	8 14 0	8 17 0	8 11 0	8 14 0	8 16 6	8 14 0	8 16 6	8 16 6
Estimated profit .			3 1 6	3 7 6	3 11 6	3 1 0	3 3 0	3 7 6	3 1 0	3 3 0	3 7 6

THE IRISH EXPERIMENTS.

TURNIP EXPERIMENTS, 1901-1910
WITHOUT FARMYARD MANURE.

MANURES.		ORIGINAL SERIES.									
YEAR.	NUMBER OF CENTRES.	YIELD.					YIELD.				
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
Sulphate of ammonia.	.	.	.	.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 cwt.	1 1/2 cwt.
Kainit	.	.	.	.	4 cwt.	4 cwt.	4 cwt.	4 cwt.	4 cwt.	4 cwt.	4 1/2 cwt.
Superphosphate.	.	.	.	.	.	.	.	.	.	.	6 cwt.
Dissolved bones.	.	.	.	.	.	.	.	.	.	.	...
Bone flour.	.	.	.	.	.	.	.	.	.	.	...
1901	7	4	10	19	8	22	9	23	14	24	8
1902.	10	5	11	17	12	18	10	23	14	23	13
1903.	20	2	2	14	7	15	1	23	5	19	9
1904.	18	4	9	20	7	21	18	24	18	25	3
1905.	12	9	8 ²	19	1	19	10	22	7	22	14 ³
1906.	27	4	19	18	5	19	11	22	16	...	...
1907.	19	4	13	15	3	16	19	19	19	...	...
1908	15	4	17	16	4	18	2	20	18	...	...
1909.	8	3	10	18	5	20	1	21	13	...	...
1910.	6	5	7	18	4	21	12	24	2	...	...
Average of the average yields.	.	4	18	17	14	19	7	22	5	28	1
Value per acre.	.	£2	9	0	£8	17	0	£11	2	6	£12
Cost of production.	.	5	7	0	6	11	0	7	8	0	12
Estimated profit.	.	2	18	0	2	6	0	4	3	6	18
											6
											3
											6

¹ Two other plots were tried this year, namely, 1 cwt. sulphate of ammonia in one, and 4 cwt. kainit in the other, but they were so clearly unprofitable that they were dropped.

2 At four centres the crops on this plot were unusually large.

3 This plot was dropped because farmers had difficulty in getting the manures.

[illegible]

and artificials. According to these experiments the most profitable dressing is 6 cwt. of superphosphate, 1 cwt. of ammonium sulphate, and 3 or 4 cwt. of kainit.

- (v.) These experiments emphasise the well-known fact that phosphates are above all others the kind of manure turnips depend upon. On the whole, slag is less effective than superphosphate, although there may be circumstances in which the contrary holds.

MANGELS.

Mangels are not widely grown in Scotland, and, for that reason, they should merely be mentioned here. Now, however, that the science of plant-breeding is being understood, it may be possible to produce more than one variety of mangel that will accommodate itself to Scotland; and the mangel experiments are put in here as fully as the turnips, in the hope that a knowledge of what can be done with this crop in Ireland may incite some farmers and experimenters to try what may be done with it in Scotland.

The course of the mangel experiments has been slightly different from the others. After four or five years it was found, by comparing the yields on the experimental plots with yields on the farmer's ordinary crop grown beside them, that the dressing of dung was not heavy enough; and the original dressing of 15 tons was raised to 20. Three years ago a new series of experiments was added, in which heavier dressings of artificials were used, just as in the experiments with potatoes and turnips.

The yields for the first year (1901) of the original series and for the first year (1908) of the new series are obviously abnormal. A consideration of the detailed returns (pp. 14-16) indicates that the farms experimented upon, as frequently happens in early years, were above the normal.

The strongest point brought out in the mangel experiments is that the crop needs a large application of dung and a full dressing of artificials, among which common salt must be included, together with ammonium sulphate and superphosphate. It is unfortunate that, in the first year's experiments of the new series, the yields were above the normal for average land, and that, having therefore only two years left, we must refrain from making estimates as to profits. These experiments *indicate*, however, that the "best" dressing of the previous series—viz., 20 tons of dung, 2 cwt. of ammonium sulphate, 4 cwt. of salt, and 4 cwt. of superphosphate—is not likely to be much improved upon.

MANGEL MANURIAL EXPERIMENTS, 1901-1910.

MANURES.			ORIGINAL SERIES.					
YEAR.	NUMBER OF CENTRES.	YIELD.	YIELD.	15 tons.	15 tons.	15 tons.	15 tons.	YIELD.
Dung	.	.	.	.	.	15 tons	15 tons	15 tons
Sulphate of ammonia	.	.	.	.	.	2 cwt.	2 cwt.	2 cwt.
Kainit	.	.	.	.	.	...	...	...
Salt	.	.	.	.	.	4 cwt.	4 cwt.	4 cwt.
Superphosphate	.	.	.	.	.	4 cwt.	4 cwt.	4 cwt.
		YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.	YIELD.
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1901 ¹	6	15 8	26 11	27 13	31 0	33 11	36 11	36 11
1902.	12	7 1	18 0	19 7	22 11	24 18	25 12	25 12
1903.	11	3 3	16 5	17 13	23 12	24 6	25 10	25 10
1904.	21	8 8	22 3	25 3	27 7	29 17	31 18	31 18
1905.	11	3 14	16 13	19 8	21 3	23 13	24 10	24 10
1906.	.	...	...	.	.	...	...	...
1907.	.	...	...	.	...	...	...	...
1908.	.	...	...	.	...	...	...	...
1909.	.	...	...	.	...	...	...	...
1910.	.	...	...	.	...	...	...	...
Average of annual averages	.	5 11	18 3	20 8	23 13	25 13	26 17	26 17
Value per acre, at 11s. a ton	.	£3 1 0	£9 19 6	£11 4 3	£13 0 0	£14 2 0	£14 15 6	£14 15 6
Cost of production	.	5 13 0	9 0 0	9 13 0	11 4 6	11 10 6	11 15 0	11 15 0
Estimated profit	.	2 12 0	0 19 6	1 11 3	1 15 6	2 11 6	3 0 6	3 0 6
		[loss]						

¹ This year is left out in calculating the average.

MANGEL MANURIAL EXPERIMENTS, 1901-1910—continued.

MANURES.		ORIGINAL SERIES REVISED.									
YEAR.	NUMBER OF CENTRES.	YIELD.		YIELD.		YIELD.		YIELD.		YIELD.	
		tons	cwt.	tons	cwt.	tons	cwt.	tons	cwt.	tons	cwt.
Dung	.	...	...	20 tons	20 tons	20 tons	20 tons	20 tons	20 tons	20 tons	20 tons
Sulphate of ammonia	.	...	...	...	...	...	...	...	...	...	...
Nitrate of soda	.	...	...	...	...	...	...	...	...	...	...
Kainit	.	...	...	...	...	...	...	...	...	...	...
Salt	.	...	...	...	...	...	...	...	...	...	...
Superphosphate	.	...	...	...	...	...	...	...	...	...	...
1901	.	9	7	24	19	27	2	29	5	34	7
1902	.	10	18	25	15	26	17	29	15	34	5
1903	.	10	18	25	15	26	17	29	15	34	5
1904	.	8	11	26	7	27	5	31	2	34	13
1905	.	7	16	24	4	25	11	27	19	30	16
1906	.	9	11	23	11	26	8	29	19	33	12
1907	.	26	...	24	19	26	13	29	12	33	11
1908	.	35	...	25	15	26	17	29	15	34	5
1909	.	24	...	24	4	25	11	27	19	30	16
1910	.	14	...	24	4	25	11	27	19	30	16
Average of annual averages	.	19	...	24	19	26	13	29	12	32	4
Value per acre, at 11s. a ton	.	£5 0 0	...	£13 14 6	...	£14 13 0	...	£16 5 6	...	£17 14 0	...
Cost of production	.	5 18 0	...	10 6 6	...	10 19 0	...	12 10 0	...	13 0 0	...
Estimated profit	.	0 18 0	...	3 8 0	...	3 14 0	...	3 15 6	...	4 14 0	...
		[loss]									

1 Applied after thinning in two dressings.

THE IRISH EXPERIMENTS.

MANGEL MANURIAL EXPERIMENTS, 1901-1910—continued.

MANURES.			NEW SERIES.											
Dung Sulphate of ammonia Salt Superphosphate	YEAR.	NUMBER OF CENTRES.	20 tons		20 tons		20 tons		20 tons		20 tons		20 tons	
			YIELD.	tons cwt.	YIELD.	tons cwt.	YIELD.	tons cwt.	YIELD.	tons cwt.	YIELD.	tons cwt.	YIELD.	tons cwt.
1901	.	.	40	4	41	3	41	10	39	15	42	1	38	14
1902	.	.	30	3	30	14	31	1	30	0	32	7	29	5
1903	.	.	33	2	34	13	34	13	33	0	35	0	32	14
1904	.	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	.	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	.	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	.	...	...	...	...	...	...	...	...	...	...	...	...	...
1908 ¹	.	17	40	4	41	3	41	10	39	15	42	1	38	14
1909	.	33	30	3	30	14	31	1	30	0	32	7	29	5
1910	.	29	33	2	34	13	34	13	33	0	35	0	32	14
Average of annual averages	.	.	...	...	...	...	...	...	...	...	...	...	...	...
Value per acre, at 11s. a ton	.	.	...	...	...	...	...	...	...	...	...	...	...	...
Cost of production	.	.	...	...	...	...	...	...	...	...	...	...	...	...
Estimated profit	.	.	...	...	...	...	...	...	...	...	...	...	...	...

¹ This year is abnormal, and, there being only two years left, no average is calculated for the new series.

THE OAT CROP.

Although some of the oat experiments have been made upon "clean" land—that is, upon land which had first carried a crop of roots or potatoes—the great majority have been carried out after lea, and the experiments must be taken as indicating the manures to be applied to oats when so grown.

These experiments show greater variation in yields on different farms than perhaps any other crop—no doubt because of the many varieties grown. Excepting in one or two exceptional districts, farmers show no serious disagreement in their choice of roots and potatoes, but they do so in their choice of oats. Were the experiments very few, this would make them unreliable; but their number enables them to be taken as representing broadly the results of manuring the average of the oats grown in the country upon the average tillage land of the country.

This same disagreement makes the valuation of the oat crop a matter of some difficulty, and the difficulty is felt more with regard to straw than to grain. Some varieties of straw, as for instance "Sandy" or "Tam Finlay," might readily be set as high as 45s. or 50s. a ton, while others among the newer varieties might even be set down as low as 25s. Looking through the lists of varieties grown in the experiments, perhaps 35s. a ton would represent their fair average value.

In their reports of the first experiments in 1901, the Irish Department set down the value of oat grain at 8d. a stone—that is 16s. a quarter for the bushel-weight of 42 lb.—and they have continued to retain that figure. But in view of the rise in prices since 1901 that figure is now too low, and we propose to set it down at 9d. a stone, which is equal to 18s. a quarter. Even this may seem low, but it has to be remembered that the oats are weighed by the instructors in autumn, as they come from the threshing-mill, and are not re-dressed. The instructors make no return as to the quantity of "light grain" to each plot, and a sum varying from 7s. 6d. to 10s. an acre is added to the value of the grain and straw to make our valuation complete. (See Tables, pp. 18, 19.)

In estimating the cost of producing an acre of oats, we have put down the sum of 15s. as due by the oat crop for the fertility accumulated by the previous pasture. This item is not usually included in similar estimates; but if we are to deal fairly with all crops and arrive at their relative positions as profit producers, it cannot be omitted. The figure 15s. can be arrived at readily in Ireland, where a great deal of land is let to be cropped for a season. Farmers are willing to give 15s. or

THE OAT EXPERIMENTS, 1901-1910.

MANURES.			ORIGINAL SERIES.														
O	YEAR.	NUMBER OF CENTRES.	YIELD.			YIELD.			YIELD.			YIELD.					
			Grain.		Straw.	Grain.		Straw.	Grain.		Straw.	Grain.		Straw.			
			cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.	cwt.	qr.	cwt.			
Sulphate of ammonia	.	.	13	1	22	16	1	27	14	0	24	19	0	33	cwt.	qr.	cwt.
Superphosphate	.	.	17	0	30	19	3	34	18	0	30	21	1	36	20	1	35
Kanit	.	.	14	0	26	15	2	29	16	2	27	15	0	33	23	0	40
	.	.	15	1	28	18	3	34	18	0	30	17	2	37	21	0	38
	.	.	15	2	23	18	0	27	17	3	26	16	3	31	22	3	41
	.	.	15	2	25	18	3	32	17	3	30	...	...	31	21	1	33
	.	.	17	3	28	20	2	34	21	3	35	...	...	40	22	1	42
	.	.	16	0	27	18	2	32	18	0	30	...	...	43	25	2	48
	.	.	17	0	27	19	1	32	19	2	31	...	...	36	22	0	37
	.	.	17	2	29	20	0	35	20	1	34	...	...	38	23	1	39
	.	.	15	3	26	18	2	32	18	1	30	...	...	38	24	2	45 ²
Average of the annual yields	.	.	15	3	26	18	2	32	18	1	30	16	1	36	22	2	40
Value per acre—grain at 9d. a stone (18s. a quarter); straw at 35s. a ton	.	.	£7	7	6	£8	17	0	£8	9	6	£7	12	9	£10	15	0
Cost of production	.	.	6	0	0	6	16	0	6	9	0	6	5	0	7	10	6
Profit	.	.	1	7	6	2	1	0	2	0	6	1	6	3	2	15	6
	.	.													3	4	6

¹ In 1901 2 cwt. of kainit were applied to these plots.

² In 1910 another plot was tried alongside this plot, getting the same three manures in the same proportions, but getting only 5 cwt. in all as against 7. The dressing was really therefore 80 lb. ammonium sulphate, 240 lb. superphosphate, and 240 lb. kainit. The average yield was 22 cwt. 2 qr. of grain and 40 cwt. of straw. Taking the one year only, a reduction of 8s. or 9s. in the cost of manure brought about a reduction of 18s. or 20s. in the value of the crop.

THE OAT EXPERIMENTS, 1901-1910—continued.

MANURES.		NEW SERIES.											
YEAR.	NUMBER OF CENTRES.	YIELD.			YIELD.			YIELD.			YIELD.		
		Grain.	Straw.	YIELD.	Grain.	Straw.	YIELD.	Grain.	Straw.	YIELD.	Grain.	Straw.	YIELD.
		cwt. qr.	cwt.	qr.	cwt. qr.	cwt.	qr.	cwt. qr.	cwt.	qr.	cwt. qr.	cwt.	qr.
1901	...	...	...	...	...	...	...	...	...	...	...	...	...
1902	...	...	...	...	...	...	...	...	...	...	...	...	...
1903	...	...	...	...	...	...	...	...	...	...	...	...	...
1904	...	...	...	...	...	...	...	...	...	...	...	...	...
1905	...	...	...	...	...	...	...	...	...	...	...	...	...
1906	...	...	...	...	...	...	...	...	...	...	...	...	...
1907	...	...	...	...	...	...	...	...	...	...	...	...	...
1908	6	15 1	19	3	20 3	28	0	22 1	30	23 3	23 0	31	...
1909	16	14 2	23	1	22 1	36	1	22 1	37	22 1	22 2	36	...
1910	14	15 0	26	3	19 3	37	3	22 2	39	22 2	23 0	39	...
Average of the annual yields.		15 0	23	0	21 0	34	1	22 1	35	22 3	22 3	36	35
Value per acre—grain at 9d. a stone (18s. a quarter); straw at 35s. a ton.		£6 17 9	£9 15 6	£10 4 9	£10 4 9	£10 4 9	£10 4 9	£10 4 9	£10 4 9	£10 9 6	£10 7 9	£10 7 9	£10 7 9
Cost of production.		6 0 0	7 6 6	7 8 9	7 6 6	7 8 9	7 8 9	7 11 0	7 11 0	7 10 6	7 12 6	7 12 6	7 12 6
Profit.		0 17 9	2 9 0	2 16 0	2 9 0	2 16 0	2 16 0	2 13 9	2 13 9	2 19 0	2 15 3	2 15 3	2 15 3

20s. more for the right to grow oats on pasture of two or three years' standing than they would for the right to grow the same crop after a grain crop following a manured root crop—that is to say, they will give this sum for fertility which they believe to have accumulated since the previous grain crop withdrew what was left by the roots.

The results of the oat-manuring experiments may be summed up shortly by saying, while oats after lea may be grown to give a profit, the profits are considerably increased by the addition of manures, and that the most profitable dressing is 1 cwt. of ammonium sulphate, 3 cwt. of superphosphate, and 3 cwt. of kainit. No more profitable dressing has been revealed by the new series of experiments.

BARLEY AND WHEAT.

The other grain crops, barley and wheat, are not grown generally over Ireland, but confined to certain districts. Barley has been subjected to manurial experiments, but these have been too few and disconnected to be referred to as authoritative. All that can be said of them is that they *suggest* that a dressing similar to the "best" dressing for oats is also the "best" dressing for barley, and brings a similar profit if the barley be up to malting quality. It is not unlikely, however, that this "best" dressing might be modified by restricting the ammonium sulphate to a half or three-quarters of a hundred-weight, or by substituting similar quantities of nitrate of soda when the previous crop has been heavily manured, or when the land is more fertile, or in better "heart," than typical barley land.

Wheat has not been subjected to systematic manuring experiments at all; but judging by the results gained by the most successful growers a dressing similar to the "best" dressing for oats is probably the "best" dressing for wheat also. But a proviso similar to that in the case of barley must be made with regard to wheat following a heavily manured root crop; and it is probable that, in the case of winter wheat, the potash and phosphates should be applied in autumn and the nitrogenous manure in the spring.

MEADOW HAY.

Meadow hay is very widely grown in Ireland. It is usually taken from a grass field that has not been pastured for many

years; but occasionally a pasture is "meadowed" for one or for several years and then put back to pasture. No distinction is made in the Department's reports between these two kinds of meadow. The yields got from the crops dealt with so far will probably have struck farmers not acquainted with Ireland as being very large, and various things may have been surmised as causes. The meadow hay yields will explain that it is not cultivation or any other cause in the farmer's hands, but merely the higher fertility of the country as a whole that accounts for the very large crops produced in Ireland.

A point arises in estimating the cost of producing meadow hay. The same point arises in connection with permanent pasture. These two crops are no part of any rotation, and they are produced at less expense. Rent and rates and taxes are the same as for other crops; but the capital required—for producing the crop only, not for consuming it—implements, management and business expenses, and loss for idle time, are all less.

MEADOW HAY EXPERIMENTS.

MANURES.							
Farmyard manure . . .	...	10 tons	...	1 cwt.	1 cwt.	1 cwt.	1 cwt.
Nitrate of soda . . .	...	...	...	1 cwt.	2 cwt.	2 cwt.	2 cwt.
Superphosphates . . .	...	...	...	...	...	2 cwt.	2 cwt. ¹
Kainit . . .	...	...	...	...	...	...	...
Year.	Number of Centres.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
1901 . . .	10	28½	38½	36½	45	48½	...
1902 . . .	8	29½	39½	34½	40½	46½	...
1903 . . .	27	29	41½	35	42½	47½	...
1904 . . .	16	28½	39½	33½	39	43½	...
1905 . . .	22	31½	40	38½	42½	46	...
1906 . . .	14	33½	43	41	46½	51	...
1907 . . .	14	32½	48½	38½	42½	49½	48½ ²
1908 . . .	17	33½	45	40	45½	48	48½ ²
1909 . . .	15	32½	47½	42½	47½	52	50½
1910 . . .	15	34½	45½	42½	47½	50½	50
Average of the average yields . . .		32½	43	38½	44	48½	49½
Value per acre at 50s. a ton, plus aftermath	£ 4 8 0	£ 6 0 0	£ 5 5 0	£ 6 0 0	£ 6 11 0	£ 6 14 0	£ 6 14 0
Cost of production . .	3 5 0	5 0 0	4 0 0	4 4 0	4 9 0	4 9 6	4 9 6
Profit . . .	1 3 0	1 0 0	1 5 0	1 16 0	2 2 0	2 4 6	2 4 6

¹ In this plot the kainit is applied not later than the end of November.

² In 1907 there were only 11 plots with this dressing, and, 10 in 1908.

If we take it that the expenses in connection with such things as those just mentioned are reduced by half, then the reduction per acre for meadow hay is about ten shillings.

The experiments bring out therefore a profit of about a pound an acre from meadow hay unmanured, and this profit doubled by an application of 1 cwt. of nitrate of soda, 2 cwt. of superphosphate, and 2 cwt. of kainit. If we compare the yields of the plot to which kainit is applied in autumn with those of the plot to which it is applied in spring, we see that the spring application has a slight advantage. A very important point is that dung, even when only two-thirds of its cost is charged to the crop manured, is not profitable. This is a striking confirmation of the opinion sometimes expressed, that if dung is to get a chance of having full effect, it should be put below the surface.

THE FLAX CROP.

Flax being no longer grown in Scotland, the only reason for referring to the flax experiments is to draw attention to that crop's extraordinary manurial demands. There having been no previous systematic experiments in Britain or elsewhere, the scheme of manuring was more tentative than usual. From the experience of Irish flax-growers it was already known that nitrogenous manures must be used sparingly; but the extraordinary result brought out by the experiments was that while, under ordinary circumstances, no nitrogen or only a small dressing is necessary, an addition of phosphates is absolutely harmful. Not only do the flax plants themselves do badly, but weeds come up with extraordinary vigour. The essential manure for flax has been found to be potash, and the more recent experiments have been devised with a view to finding out chiefly how much and in which form it should be applied.

VARIETY EXPERIMENTS.

Alongside the manurial experiments there have all along been sets of what have been called "variety experiments" for each crop. In these experiments different varieties of each crop have been grown side by side under similar conditions in order to determine which gave the most profitable yield. The great authority which now attaches to the manurial experiments

has been attained by what might be called a cumulative effort: by the self-same experiments having been carried on at many centres continuously for a number of years. The result of the variety experiments is also cumulative; but in respect of a number of varieties the cumulative effort has been continued for a shorter period. We can illustrate this by reference to the potato.

POTATOES.

Ten years ago there were ten varieties thought fit to be put in competition. Since then, other varieties, some of them new, some of them old, have come into view. Had each of these varieties been added to the original ten, as they turned up, there would now be twenty or thirty plots in each potato variety experiment. Farmers could not be expected to undertake such a number. Consequently, when experimental varieties showed that their quality or their cropping powers were only moderate, they were cut out of the experiments and other likely varieties took their place. At the same time it ought to be mentioned that no new variety has been introduced to the general experimental schemes without having been tried previously at one of the Department's farms or elsewhere. The result is that while some varieties have been in the field experiments for ten years, others have been in for a shorter time, and so the cumulative result is not equal in all cases. The varieties eliminated from the experiments from time to time tell their own tale. And there is no need, in tabulating the results, to do more than mention their names.

With regard to variety experiments, much more than to manurial experiments, it must be borne in mind that, while their results hold good for the country as a whole, there are districts here and there, and even individual farms, with peculiarities of soil, climate, and markets, for which special varieties of crops are best suited. Cases of that kind are not forgotten in the scheme of experiments, but the results, having only a local application, are not specially published. With this short explanation we may now tabulate the variety experiments. (See p. 24.)

[TABLE.

POTATO VARIETY EXPERIMENTS.

	Number of Centres.	UP-TO-DATE.		Number of Centres.	CHAMPION.		Number of Centres.	BLACK SKERRIES.		Number of Centres.	DITCHES OF CORNWALL.		Number of Centres.	FACTOR.	
		Saleable.			Small.	Saleable.		Small.	Saleable.		Small.	Saleable.		Small.	
		tons	cwt.												tons
1901	17	13	14	23	16	10	15	43	15	8	12	26	...	...	...
1902	10	8	14	24	10	6	8	45	10	6	6	30	...	...	...
1903	7	10	10	19	7	7	10	30	7	7	11	19	...	...	...
1904	20	8	12	26	21	7	2	32	15	5	17	20	...	...	...
1905	34	11	18	35	35	8	6	46	32	5	7	0	...	...	...
1906	22	7	12	26	22	5	18	38	23	5	8	30	16	...	...
1907	31	7	12	33	27	6	10	47	24	5	16	31	18	...	...
1908	42	10	10	38	42	7	18	42	32	7	7	28	42	...	...
1909	26	11	4	37	25	8	15	48	23	8	7	29	25	...	...
1910	17	8	8	41	17	6	12	55	17	6	3	31	17	...	...
		IRISH QUEEN		SHANROCK.		BRITISH QUEEN. ¹		ABUNDANCE. ¹							
1905	...	...	...	...	...	33	10	2	38	...	...	...	...	...	...
1906	...	...	...	...	...	22	6	15	28	...	...	...	...	...	...
1907	...	...	...	...	...	25	7	4	35	10	6	4	45	...	...
1908	18	8	16	22	...	47	8	7	44	26	8	13	33	...	...
1909	26	9	7	20	22	10	2	22	36	21	9	13	41	...	...
1910	17	7	10	28	17	8	16	31	46	17	6	19	46	...	...

¹ These are mid-season varieties, the others are all late varieties.

Other varieties tried were as follows :—

NAME OF VARIETY.	YEARS EXPERIMENTED WITH.	NAME OF VARIETY.	YEARS EXPERIMENTED WITH.
Hibernia . .	1901, 1903, and 1904	Evergood . . .	1903 to 1908
Beauty of Bute . .	1901 to 1908	Northern Star . .	1905 to 1909
Champion II. . .	1901 to 1908	Langworthy . . .	1905 to 1909
Diamond Jubilee . .	1901	Discovery . . .	1906
Maincrop . . .	1901	Dalmeny Beauty . .	1908 and 1909
Reliance . . .	1901 to 1904	Scottish Triumph . .	1908 and 1909
Epicure . . .	1901	Colleen . . .	1909
Charles Fidler . .	1902 to 1904	Royal Kidney . . .	1906 to 1909
Dr Matthew . . .	1902 and 1903	Windsor Castle . .	1909

Summing up the above experiments, it might be said that, of the late varieties, one only—*Up-to-Date*—has stood the test from the beginning. *Duchess of Cornwall* and *Factor* have stood since their introduction in 1905 and 1906 respectively; and two other varieties, *Irish Queen* and *Shamrock*, which have also stood since their introduction, may be looked upon as still on probation. The *Champion* and the *Black Skerry* retain their places because their excellent table qualities, which are well-known in Ireland only, keep them in strong demand. *Black Skerries* sell higher than any other late variety in the north-east of Ireland. Of the mid-season varieties, only *British Queen* and *Abundance* have kept their place.

TURNIPS.

There has been no such thorough sifting out of indifferent varieties of turnips as there has been of potatoes, probably because the sifting in the one case is more difficult than in the other. With potatoes, the market comes to our aid; but with turnips there is no such aid, and we have not yet learned clearly how to consult the animals who consume them. Consequently it may be best to give results not only about the varieties that have come right through the trials, but also about those which have come through five or six years. (See p. 26.)

The varieties experimented with for a shorter time are—

Lord Derby	1901.
Halewood	1901.
Defiance	1901-5.
Queen	1901-4 and 1909.
Bronze Top	1906-9.
Monarch	1906-9.
Incomparable Green Top . .	1910.

TURNIP VARIETY EXPERIMENTS.

SWEDES.											
Year.	Number of Centres.	STIRLING OF CASTLE.	Number of Centres.	IMPROVED PURPLE TOP.	Number of Centres.	Number of Centres.	ELEPHANT.	Number of Centres.	KANGAROO.	Number of Centres.	BEAST OF ALL.
		tons cwt.		tons cwt.			tons cwt.		tons cwt.		tons cwt.
1901	15	22 16	15	22 6	15	25 6	25 6	15	25 6	15	27 9
1902	4	19 15	5	20 11	5	19 16	19 16	4	22 6	5	23 11
1903	15	25 11	15	25 19	15	24 4	24 4	15	24 18	15	26 5
1904	18	26 8	18	25 16	18	25 17	25 17	18	25 1	18	27 5
1905	14	23 16	15	24 10	15	23 7	23 7	14	25 16	15	26 14
1906	12	25 0	13	27 16	13	26 2	26 2	13	27 3	13	29 13
1907	7	21 12	16	23 13	16	22 16	22 16	9	21 2	16	26 5
1908	10	18 18	16	21 3	17	20 0	20 0	17	21 1	18	22 9
1909	13	20 11	20	22 0	24	21 3	21 3	23	22 9	26	22 13
1910	11	21 4	11	23 13	11	22 9	22 9	...	...	11	24 14
											tons cwt.
											24 7
											24 8
											25 18
											26 19
											24 15
											28 0
											24 0
											21 19
											20 13
											20 13
											23 2
TURNIPS.											
	ABERDEEN GREEN TOP.	FOSTERTON HYBRID.	PURPLE TOP.	ACHILLES.	CENTENARY.						
1901	10	24 10	10	24 17	10	22 17	22 17	...	...	...	...
1902	5	20 3	5	24 5	5	23 14	23 14	5	27 4	...	...
1903	11	28 8	11	29 17	6	31 0	31 0	10	36 16	...	...
1904	13	30 7	12	30 16	12	31 11	31 11	10	36 16	...	...
1905	10	28 6	11	31 0	9	31 6	31 6	10	36 10	...	...
1906	12	26 11	12	27 4	...	...	...	12	29 5	...	...
1907	6	26 2	5	27 13	...	...	...	6	30 15	...	...
1908	12	25 19	11	27 8	...	...	...	13	28 8	...	...
1909	7	25 10	...	...	...	...	...	8	32 15	...	...
1910	11	25 6	...	...	...	...	...	11	30 3	...	...

OATS.

In connection with the oat variety experiments, a point already referred to when discussing potato varieties needs to be referred to again, and referred to with more emphasis than before, viz., that in the variety trials the varieties of oats grown in the country have been by no means completely exhausted. In a crop having so many varieties this could not be done. What has been attempted has been to test varieties likely to be applicable to the country as a whole and leave aside varieties suited or believed to be suited to special districts.

Instructors have tried local varieties alongside those in the general scheme, but the returns for those local varieties are not now made known outside their own districts. Even, however, where local varieties are not officially tested alongside the others, they are incidentally compared with the varieties officially tested by the very fact that both are grown in the same neighbourhood.

OAT VARIETY EXPERIMENTS.

YEAR.	Number of Centres.	POTATO.			Number of Centres.	BLACK TARTARY.			Number of Centres.	WAVELEY.		
		Grain.		Straw.		Grain.		Straw.		Grain.		Straw.
		cwt.	qr.	cwt.		cwt.	qr.	cwt.		cwt.	qr.	cwt.
1901	13	15	1	22½	13	18	1	25	13	22	2	25½
1902	13	20	1	36½	13	21	0	33½	13	23	2	34½
1903	10	18	1	41	9	19	3	40	10	22	2	36
1904	14	19	0	36	15	20	1	35	15	22	2	35
1905	...	...	...	...	...	...	...	...	...	...	...	...
1906	12	19	3	35	6	19	2	30	12	20	3	33
1907	7	20	1	37	4	20	2	35	7	22	1	36
1908	12	19	3	29	9	21	2	31	14	22	0	30
1909	10	25	1	39	11	25	2	36	13	26	0	32
1910	11	23	2	40	11	23	3	42	11	23	3	38
		ABUNDANCE.				TARTAR KING.				BANNER.		
1901	12	21	1	27½	11	19	0	26¾	...	...	...	...
1902	13	20	2	30	13	18	3	28½	8	23	0½	32
1903	9	19	1	33	9	18	1	33	9	22	2	39
1904	15	21	1	33	12	19	1	29	7	23	3	40
1905	...	...	...	...	...	...	...	...	...	...	...	...
1906	11	20	2	32	12	20	0	30	11	22	0	34
1907	7	19	0	36	7	19	1	35	7	21	0	33
1908	10	22	1	30	6	22	1	31	11	21	2	32
1909	7	23	3	30	6	26	2	34	10	25	3	34
1910	11	22	3	37	11	22	2	38	11	24	2	36

The other general varieties which have been tried are :—

Goldfinder	.	.	1901-4.
Pioneer	.	.	1901-4.
Storm King	.	.	1902-4 and 1909.
Newmarket	.	.	1907-9.

MANGELS.

The mangel variety experiments have not been reported continuously since 1901, and consequently have less authority than the others. Their results in the main will be indicated by saying that four varieties have kept their place in all the experiments that have been reported. Their names and their yields at 24 centres for 1910 are as follows :—

			tons	cwt.
Yellow Globe	.	.	30	2
Prize Winner	.	.	32	1
Golden Tankard	.	.	23	2
Long Red	.	.	27	11

BARLEY.

In some respects, although the varieties dealt with have not been many, and those varieties have been submitted to fewer tests than other crop varieties, the barley variety experiments have been the most satisfactory of all; for while the results attained have been of great importance to the barley crop itself, they have indicated what may possibly be done with other crops also. In the barley experiments, manurial as well as variety, the Department of Agriculture have had the valuable co-operation of Messrs Guinness, the well-known brewers, by which it has been possible to deal not only with questions of yield but also with questions of quality. The experiments were started in 1901, like the others, but instead of being distributed among the county instructors in agriculture they have been carried out under the separate charge of an individual officer from the beginning. That officer has been changed once during the course of the experiments, but the change made no break in continuity.

In barley two things are desired specially—yield and malt-ing quality—and the purpose of the trials has been to find which barleys were the best with regard to those two points combined. Straw is of secondary consideration, unless in so far as it stands up and does not become brittle and so lose the head when ripe. As with other crops there are here also questions of special varieties to suit special soils and

conditions ; but although this has been dealt with incidentally, the main purpose of finding a barley suitable to the barley districts of Ireland as a whole has always been kept to the front.

The varieties tried in the first six years of the experiments were Archer's Chevallier,¹ Scotch Chevallier, Goldthorpe, Standwell, Brewer's Favourite, Hallett's Pedigree, Invincible, and Old Irish (a Chevallier). The results brought Archer clearly to the top. Goldthorpe alone had a slightly better malting quality, but not enough to compensate for a smaller yield. Referring to the experiments from 1901 to 1906 the barley expert writes in the Department's Journal for 1908 : "The only variety approaching Archer in return per acre was Goldthorpe, but in fifty-one tests carried out in the six years the average value per acre of this barley was 12s. per statute acre less than that of Archer." Since this was written the fifty-one tests have been increased by 1910 to sixty-seven.

In 1906 another variety, Tystofte Prentice, was introduced from Denmark at the instance of one of Messrs Guinness's officials who had seen it growing there. This variety was also an Archer, but it had been re-selected in Denmark. The Danish re-selection was what is called a "single ear" selection, a kind of selection first systematically carried out nearly a hundred years ago by Patrick Sherriff at Mungoswells in East Lothian. That is to say, a number of ears were first selected at a Danish experiment station and their progeny kept separate and pure for some generations. Then those that gave the best yield and quality were sent out for general cultivation.

In the Irish experiments of 1906 this new variety from Denmark came out better than the Irish variety of Archer : "with a money value of 11s. 6d. per statute acre in excess of Irish Archer, which was 9s. 5d. per statute acre better than Goldthorpe." In his report for 1906 the barley expert suggested that the superiority of the Danish Archer might be "ascribed to its purity, the process of selection it has been subjected to in Denmark, to the change of soil and climate, or to a combination of all these circumstances."

Having determined by 1906 that the best native variety of barley was Archer, and having found in that year that the Danish Archer was still better, the next point to be determined was whether the progeny of the Danish seed would continue to hold its own in succeeding years or whether it would be necessary to import Danish seed annually ; and to that end the experiments have since been largely conducted. To determine the point, seed grown in Ireland but descended from that brought from Denmark in 1906 has been sown every

¹ It is not really a Chevallier although it is usually so called.

year since 1907 against fresh seed imported every year from Denmark. The results of these two plots go to show that one of the factors suggested by the barley officer, viz., "change of soil and climate," does not affect the hereditary yielding power or quality of Danish Archer. The Irish-grown seed does not deteriorate in Ireland. But to the two plots indicated above another plot was added. As early as 1904 the barley expert had observed that impurity is a very important cause of impaired yield in barley—as it is in other crops. A "best" barley is introduced, but in a few years, chiefly by means of the threshing-mill, it is seriously contaminated. Consequently a mixture of the "best" with a number of inferior varieties is what is really sown, and the yield of what is believed to be the "best" variety declines. In order therefore to have a pure sample of Irish Archer to put against the two Danish plots, "a large number of ears of Archer were selected from one of the experimental plots in Queen's County in the autumn of 1904, and bulks of grain from these increased yearly until in 1907 there was a sufficient quantity in hand to sow the plots." But the barley expert was not satisfied with the purity of produce of these unseparated ears. Having selected some individual ears and kept their stock pure, he was able in 1908, and every year since, to place an Irish Archer barley descended from a singly selected head against the other two plots.

Besides giving a smaller yield than the Danish Archer, the original Irish Archer was also lower in malting quality. The crop of 1907 from a number of hand-selected heads was an improvement in quality upon previous years of Irish Archer; and the crops of 1908, 1909, and 1910 from a single head have been equal in quality to Danish Archer. The yields of the three plots for 1907, 1908, 1909, and 1910 are shown in the following table:—

	Number of centres.	Danish seed imported annually.		Seed descended from seed imported from Denmark in 1906.		Irish Archer from hand-selected seed in 1907, and in a "pure line" since.	
		Barrels. ¹	Stones.	Barrels.	Stones.	Barrels.	Stones.
1907 .	10	13	2	13	$\frac{1}{2}$	12	14
1908 .	8	11	13 $\frac{3}{4}$	11	10 $\frac{3}{4}$	11	15 $\frac{3}{4}$
1909 .	8	14	10	14	12	14	9
1910 .	6	10	13	11	...	10	13

¹ A barrel of barley weighs 16 stones.

As already mentioned the first two of these plots show that the yielding power of Danish Archer in Ireland is not decreased by its being grown in Ireland, while the third plot shows that a strain equal in value to the Danish re-selection has been got from ordinary Archer barley. The Irish and Danish re-selections may be the same strain, and both may be the same as the original Archer, in which case all that has been done is to separate the original selection from the impurities which time has gathered round it. Or all three varieties may be different, and the Danish and Irish selections may be varieties never identified before. Either way, these selections show the possibility of raising varieties of the highest value from those already in our possession, and they point to a field in which much may be done to increase agricultural production for years to come.

Already the work done with barley has led to similar work being begun with oats and wheat; and although nothing is yet published, it may be said now that results of similar importance may soon be expected from these crops.

WHEAT.

Wheat variety experiments were begun only in 1907, and as they have gone on for so short a time we need do no more than set down their results in tabular form.

	White Stand Up.		White Queen.		Square Head-master.		Red Fife.	
	Good corn.	Screenings.	Good corn.	Screenings.	Good corn.	Screenings.	Good corn.	Screenings.
	cwt. qr.	%	cwt. qr.	%	cwt. qr.	%	cwt. qr.	%
1908 . .	24 1	4.4	23 1½	4.1	26 0	4.6	19 2	8.4
1909 . .	27 1	3.5	24 3	4.8	28 1	3.9	19 2½	6.3
1910 . .	26 1	3.3	22 3	3.8	25 2	4.4	19 2½	5.5

In addition to the crop experiments so far dealt with, there have been others of less general interest, usually less sustained and less widely carried out. Many of these have been connected with crops of no great interest outside Ireland—as, for instance, with flax and tobacco—but a few connected with the potato crop might be referred to shortly.

Before the Irish Department of Agriculture was established the Congested Districts Board had carried out a number of experiments in spraying, whose results were the means of

greatly improving the success with which potatoes could be grown in Ireland, particularly in the western districts. The Department carried out spraying experiments in other parts of Ireland for several years; but there was little need for these being long continued, as the beneficial effects of spraying soon became known throughout the whole country.

Having observed that the climate of the southern and south-western coast of Ireland is very similar, especially as regards spring temperatures, to that of other parts of the United Kingdom in which early potatoes are grown, the Department determined to try whether this industry might not be introduced into Ireland. Lectures on the subject were delivered at selected centres in the autumn of 1901, and next spring experiments were carried out in Counties Dublin, Cork, Kerry, and Sligo. These showed that early potatoes could be produced with considerable profit. The experiments were continued in succeeding years, and the industry has now been fairly well established.

The boxing of potatoes—that is, sprouting the seed tubers in boxes and planting them with the sprouts thickly and strongly grown—has been practised in England and Scotland for sixty or seventy years; but the practice has been applied chiefly to early potatoes. Experiments were begun in Ireland in 1903 to test the effect of boxing late varieties. The following are the results:—

	No of centres.	Yield from unsprouted seed.		Yield from sprouted seed.	
		tons	cwt.	tons	cwt.
1903	12	9	8	11	1
1904	34	8	13	11	6
1905	91	10	16	12	17
1906	67	9	2	11	9
1907	67	8	6	10	6
1908	67	10	15	13	0
1909	50	10	4	12	19
1910	288	10	1	12	5
Average of the { average yields . }	...	9	13	11	18

The average gain in yield from sprouted as against unsprouted seed is thus about 2 tons 5 cwt. to the statute acre.

For a number of years many English potato-growers have been accustomed to buy their “seed” potatoes from Scotland, for the reason that such seed yields a larger crop than seed

grown in England, or at any rate in the warmer parts of England. The Agricultural Department of Cambridge University made some experiments on the question and found the case to be as stated. In 1906 and 1907 experiments were carried out to test how far "seed" grown in Ireland behaved like that grown in Scotland. In these years seed grown on Irish farms was planted in England, Wales, and Scotland alongside seed grown in England and Scotland, and the results showed that Irish "seed" was very similar in its producing powers in England to seed grown in Scotland.

EXPERIMENTS WITH STOCK.

So far, experiments with stock have been far less numerous than experiments with crops. Such experiments have many more difficulties to face, not the least of which is that we have not yet made up our minds as to what should be attempted or how the attempt should be made. There is, for instance, to take the simplest kind of subject, no series of experiments yet in existence in which weak food rations have been systematically eliminated as weak manurial mixtures have been eliminated in the Irish field experiments. Consequently, it is scarcely to be expected that Ireland—where farms are small, where purposes change, and where systematic organisation of farm labour and management is less thorough than elsewhere—should have carried out stock experiments equal in authority with those in regard to crops. That being so, we shall pick out one only, which is by no means exhaustive, but which may be interesting to those who fatten Irish bullocks, not only for the results it brought out but also for the fact that incidentally it shows in some detail how store bullocks are raised in Ireland.

The experiment was upon the rearing and subsequent "storing" of Irish calves. Its purpose was not to find a ration which would rush the calves on with a view to their reaching the butcher early—whole milk direct from the cow would do this of course—but rather, having in view the prevailing Irish practice of rearing calves on separated milk and some fat substitute, to see which of several rations would yield the highest profit.

Enough calves were bought in the springs of 1901, 1902, and 1903 to make four lots of 8 to 10 calves in each lot, with one or two extra to be treated similarly to those in the lots to take the place of any experimental calves that might die or break down in any other way. The calves, having been bought and collected together, were drafted as evenly as possible a fortnight before being put upon experimental rations,

and their rations gradually changed to those to be given them during the experiments. By the time the experiments proper commenced the calves were on the average about 6 or 7 weeks old, and in weight somewhere near 140 lb. The rations for the several lots and their weights at the beginning of the experiment and at the end of each month were as follows:—

RATIONS IN 1901.

		First fortnight.	Second fortnight.	Next twelve weeks.	Second last fortnight.	Last fortnight.
Lot I.	Whole milk .	5 quarts	6 quarts	6 quarts	4 quarts	2 quarts
	Linseed-cake .	4 oz.	6 oz.	8 oz.	10 oz.	16 oz.
Lot II.	Separated milk	4 quarts	5 quarts	5 quarts	3 quarts	1½ quart
	Whole milk .	1 quart	1 quart	1 quart	1 quart	½ quart
	Linseed-cake .	4 oz.	6 oz.	8 oz.	10 oz.	16 oz.
Lot III.	Separated milk	5 quarts	6 quarts	6 quarts	4 quarts	2 quarts
	Cod-liver oil .	1½ to 2 oz.	2 oz.	2 to 2½ oz.	2½ oz.	1½ oz.
	Linseed-cake .	4 oz.	6 oz.	8 oz.	10 oz.	16 oz.
Lot IV.	Separated milk	5 quarts	6 quarts	6 quarts	4 quarts	2 quarts
	Indian meal .	4 oz.	6 oz.	8 to 12 oz.	12 oz.	6 oz.
	Linseed-cake .	4 oz.	6 oz.	8 oz.	10 oz.	16 oz.

AVERAGE WEIGHTS OF CALVES IN 1901.

	At beginning of experiment.	At end of four weeks.	At end of eight weeks.	At end of twelve weeks.	At end of sixteen weeks.	At end of twenty weeks.	Total gain.	Daily increase.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Lot I. .	137·0	182·0	235·4	291·4	345·6	375·6	238·6	1·70
Lot II. .	145·3	182·9	231·9	285·0	327·5	343·6	198·3	1·41
Lot III. .	137·8	168·6	214·4	260·1	296·4	314·0	176·2	1·26
Lot IV. .	137·4	172·5	212·6	256·9	299·6	317·6	180·2	1·26

None of the lots makes a heavy increase; but, as has been mentioned already, that was not the purpose of the experiment.

The rations for 1902 and 1903 were the same for both years, but were slightly different from those of 1901. The calves were better fed during the first and last months of the experiment, while during the middle period of 12 or 13 weeks there was no change, excepting that for the fourth lot of calves a mixture of flax seed 1 part, oatmeal 2 parts, and Indian meal 2 parts was substituted for Indian meal alone.

The following tables show the rations and the weights of the calves for 1902 and 1903:—

RATIONS IN 1902 AND 1903.

		First three weeks.	Next thirteen weeks.	Second last fortnight.	Last fortnight.
Lot I.	Whole milk	6 quarts	6 quarts	4 quarts	2 quarts
	Linseed-cake	6 oz.	8 oz.	16 oz.	16 oz.
Lot II.	Separated milk	5 quarts	5 quarts	3 quarts	1½ quart
	Whole milk	1 quart	1 quart	1 quart	½ quart
	Linseed-cake	6 oz.	8 oz.	16 oz.	16 oz.
Lot III.	Separated milk	6 quarts	6 quarts	4 quarts	2 quarts
	Cod-liver oil	2 oz.	2 oz.	2 oz.	1 oz.
	Linseed-cake	6 oz.	8 oz.	16 oz.	16 oz.
Lot IV.	Separated milk	6 quarts	6 quarts	4 quarts	2 quarts
	A mixture of—				
	Ground flax seed, 1 part	4 oz.	6 to 8 oz.	8 oz.	4 oz.
	Oatmeal, 2 parts				
	Indian meal, 2 parts				
	Linseed-cake	6 oz.	8 oz.	16 oz.	16 oz.

AVERAGE WEIGHTS OF CALVES IN 1902 AND 1903.

		Begin- ning of ex- periment.	End of 4 weeks.	End of 8 weeks.	End of 12 weeks.	End of 16 weeks.	End of 20 weeks.	Total gain.	Daily gain.
Lot I.	1902	142.0	192.4	250.1	312.8	372.2	433.5	291.5	2.08
	1903	133.6	182.9	241.5	305.7	369.9	421.9	288.3	2.06
Lot II.	1902	134.0	182.3	235.2	278.8	335.1	388.7	254.7	1.82
	1903	142.5	189.8	231.5	286.9	349.0	381.7	239.2	1.71
Lot III.	1902	132.2	176.5	224.7	270.1	321.6	376.3	244.1	1.74
	1903	145.8	187.5	233.5	286.7	352.1	386.8	241.0	1.72
Lot IV.	1902	142.7	190.8	236.0	286.7	344.2	398.9	256.2	1.83
	1903	145.8	190.9	241.6	301.0	370.6	411.0	265.2	1.89

From the standpoint of total increase, we cannot say whether the smaller gains made by the calves of 1901 were the result of their having less to eat, because there was no check plot connecting the rations of 1901 with those of 1902 and 1903 in such a way as to eliminate other possible causes of difference. But whole milk gives the largest increase every year, while in the two years in which it was tried the mixed-meal ration comes second. The two other rations tried in 1902 and 1903 come out practically even. From the standpoint of profit, however, the results are different. To determine this point we shall depend upon the results of 1902 and 1903 only, taking the

average of the two years. To the value of the calves at the beginning of the experiment we must add the cost of their 20 weeks' keep, and subtract the total from their value at the end. These two "values" are only estimates, but they can be made sufficiently close to bring out the comparative financial effects of the different rations. The following table shows the results:—

	Lot I.	Lot II.	Lot III.	Lot IV.
Value at beginning of experiment . . .	£2 10 0	£2 10 0	£2 10 0	£2 10 0
Cost of foods	4 1 2	1 12 6	1 10 5	1 7 8
Attendance, at $\frac{3}{4}$ d. a-day	0 5 8	0 5 8	0 5 8	0 5 8
Insurance, at 10 % the average value of the calves	0 3 0	0 3 0	0 3 0	0 3 0
Interest on capital, at 5 %	0 1 6	0 1 6	0 1 6	0 1 6
Pasture, say	0 5 0	0 5 0	0 5 0	0 5 0
	£7 6 4	£4 17 8	£4 15 7	£4 12 10
Value at end of experiment	5 10 0	4 17 6	4 15 0	5 0 0
Profit or loss	£1 16 4 [a loss]	£0 0 2 [a loss]	£0 0 7 [a loss]	£0 7 2 [a profit]

It is not altogether satisfactory to have to estimate the values of the calves, but the figures given are near what would have been got for them had they been sold. If the valuation is approximately correct, then the meal-mixture ration alone gave a profit, while the whole-milk ration resulted in a loss. We can, of course, make no inference as to what would have been the result had the whole-milk lot of calves, or indeed any of the lots, been fed with larger quantities.

The experiments, however, did not stop when the calves were weaned, but were continued to see how the calves might be affected as "stores" by the rations they had been given as calves. Unfortunately this part of the experiment was less satisfactory. The calves of 1901 took hoose, and those of 1902, which were reared within the grounds of the Cork Exhibition and removed to County Donegal in autumn, did badly after weaning: circumstances which make it unsafe in both cases to draw conclusions as to how far the behaviour of the "stores" was influenced by their calf rations. So far as could be judged, the calves of 1903 ran a more normal course after weaning, and the results in their case are probably more reliable.

After weaning in October, till the end of the following April, the calves were "wintered" upon 1 lb. of linseed-cake, 1 lb. of crushed oats, and as much good rye-grass and meadow hay as they would take, together with a run upon pasture. From the end of April till the middle of October, when they were sold, the calves—now yearlings—were, upon pasture only. The following table will show their progress:—

WEIGHTS OF STORES.

	At end of rearing period. (10th Oct.)	Wintering Period.			Grazing Period.			Gain to end of March.	Total gain during the year.
		At end of 8 weeks. (5th Dec.)	At end of 16 weeks. (30th Jan.)	At end of 24 weeks. (26th March.)	At end of 36 weeks. (18th June.)	At end of 48 weeks. (10th Sept.)	At end of 53 weeks (14th Oct.)		
Lot I. . .	1b. 121·9	1b. 458·9	1b. 488 2	1b. 529·0	1b. 651·1	1b. 830 6	1b. 893 9	1b. 107·1	1b. 472 0
Lot II. . .	381·7	419·8	439·4	478·6	576·4	744·6	786·8	96·9	405·1
Lot III. . .	386·8	422·4	445·8	478·8	597·4	771·7	830·2	92·1	443·1
Lot IV. . .	411·0	434·1	461·5	502·0	608·9	801·7	847·7	91·0	436·7

It will thus be seen that each lot makes a very small gain—less than a hundredweight—during the winter. During the summer the whole-milk calves more than maintain their lead, while the cod-liver oil calves creep up upon those getting the meal-mixture; and lot II. falls still farther behind.

But how does the question of profits now stand? Which is the best calf ration for animals to be sold as “stores” at eighteen months old? Unfortunately the above animals—the 1903 calves—were sold, when eighteen months old, as one lot. Their total selling price worked out at 26s. 5½d. per live-weight cwt. unfasted. Using this figure, we can find the average value for each lot, though not satisfactorily, since this method makes no allowance for the “condition” of each lot. But in no case was the “condition” good enough to have affected the price per cwt. very seriously. Then having found the average values, we can subtract from them the costs to the end of the rearing period; and the differences will show how much money was left by each lot to pay for the following year’s keep. From the results so gained we can compare profits.

	Lot I.	Lot II.	Lot III.	Lot IV.
Value at eighteen months . . .	£10 11 0	£9 5 9	£9 15 11	£10 0 1
Cost to end of rearing period . . .	7 6 4	4 17 8	4 15 7	4 12 10
Sum left for year’s keep . . .	£3 4 8	£4 8 1	£5 0 4	£5 7 3

These figures show that the mixed-meal ration is still the

most profitable, and the whole-milk ration the least so. As already mentioned, these experiments indicate the treatment and progress of Irish store cattle in Ireland, and also how small are the profits in the cattle-rearing industry.

The Irish field experiments raise a problem of very considerable agricultural and national importance, to which we may be pardoned for briefly drawing attention. Let us compare in parallel columns and in rough figures the profits which the experiments show may be gained by manuring crops in the ordinary way on the one hand and by manuring them well on the other. (See Table).

ORDINARY MANURING.			GOOD MANURING.	
CROP.	MANURE.	PROFITS.	MANURE.	PROFITS.
Potatoes .	20 tons dung .	£2 5 0	15 tons dung 1 cwt. sulphate of ammonia . 1 cwt. superphosphate . 2 cwt. muriate of potash .	£5 5 0
Mangels .	20 tons dung .	£3 7 6	20 tons dung 2 cwt. sulphate of ammonia . 4 cwt. salt 4 cwt. superphosphate . .	£5 7 6
Turnips .	10 tons dung . 4 cwt. superphosphate	£3 5 0	10 tons dung 6 cwt. superphosphate . . or 1 cwt. sulphate of ammonia . 3 cwt. kainit 6 cwt. superphosphate . .	£3 10 0 £4 10 0
Oats . .	No manure .	£1 7 6	1 cwt. sulphate of ammonia . 3 cwt. kainit 3 cwt. superphosphate . .	£3 5 0
Meadow hay	No manure .	£1 2 6	1 cwt. sulphate of ammonia . 2 cwt. kainit 2 cwt. superphosphate . .	£2 2 6

The first point to be noted is the way in which profits are increased by the use of suitable artificial manures. The root crops, which can only be grown at a loss without manures, are grown at a good profit with dung, but at a very much higher profit when suitable artificial manures are added. Grain crops and hay can be grown to produce a profit without manure, but the profits are again increased by artificial manures. Do not these points suggest the possibility of reclaiming to tillage some of the land that went back to pasture because it was believed at the time to be more profitable than tillage? If tillage crops were less profitable than pasture thirty or forty years ago, need they be so now that we have the means and the knowledge to

make them more profitable? But is pasture really so very profitable as is frequently asserted? We do not mean profitable to consume—that is profitable to the farmer or grazier who feeds his stock upon it—but profitable to the man who grows it as a crop. What is the grazing rent of temporary pasture on land similar to that upon which the Irish experiments have been carried out? Forty-five or fifty shillings. Three pounds perhaps at the most. Take it at the highest figure and subtract the cost of production. It will be remembered that in discussing costs of production, it was necessary to lay out a sum of fifty shillings an acre for expenses common to every crop before the costs of the usual labour could be considered. To that sum, in the case of a temporary pasture, there have to be added only its share of the seeds with which it was sown down and a small additional sum for weeding and perhaps harrowing and rolling. If we assume that a year of hay is followed by two years of pasture, then the share of each pasture year in the seed is six or seven shillings. Putting the whole at the lowest, and saying that seeding, weeding, and all else necessary cost 7s. 6d., then the cost of producing an acre of temporary pasture works out at £2, 17s. 6d. per annum. From this, however, has to be subtracted a sum for accumulating fertility, which we may put down at 7s. 6d. per annum. Sometimes it ought to be higher, frequently much less. So the annual cost, all additions and subtractions considered, is about 50s. an acre; for which we occasionally get a return of £3, but very often a great deal less. Is this a profitable crop?

Compared with hay or grain the returns from temporary pastures are very small; compared with roots and potatoes they are miserable. In the case of old pastures, the profits may be slightly higher, since the initial cost is spread over more years and the annual costs are smaller; but they do not rise to the level of those produced from tillage crops on the ordinary tillage land of the country and on land of still better quality. Which of the two is doing the better in business: the Irish farmer who says his land is too good to till, or the East country Scotsman who says he cannot afford to grow pasture on his good land?

THE FARM STABLE.

By C. W. SLEIGH, M.A., Strichen, Aberdeenshire.

Stable.

IN this article carriage-horse stables will not be discussed, as the equipment of these will depend on the fancy and the purse of the owner. A farm-horse stable, on the other hand, is usually built in a less expensive style.

Site.

The position of the stable should be carefully considered with relation to the cart-shed, the straw-barn, and immediate access to the main roads.

Walls, &c.

The height of walls should in no case be less than 8 feet, and 9 feet is preferable, in order to give sufficient headroom at doors and windows. The inside walls should be smoothly plastered with cement from floor to wall-heads.

Roof.

The roof is usually constructed (fig. 1) of the ordinary rafters and tie couples, set at 18-inch centres, covered with 7 inch by $\frac{3}{4}$ inch unchecked sarking, and slated with slates all of one size, colour, quality, and thickness. The roof should always have rhones or eaves and gutters to conduct the roof-water to the drains.

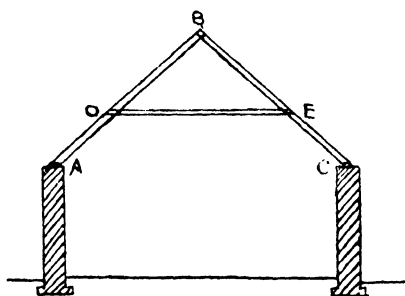


Fig. 1.—Usual couple roof.

A better style of roof is shown in fig. 2. This makes a very open and easily cleaned roof inside. It consists of principal rafters, set about 8 or 9 feet apart, purlins running the length of the stable, and sarking on the top of the purlins.

The main rafters are pitch pine, and measure 9 inches by

2½ inches for a width of stable of 22 feet inside, and are bound together by iron rods and iron struts, &c.

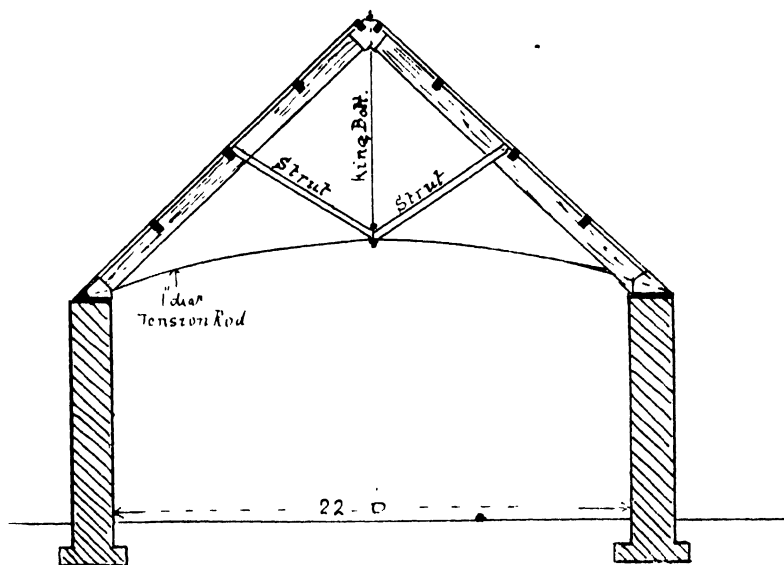


Fig. 2.—Roof with bound principal rafters, struts, ties, purlins, &c.

The foot of each main rafter is fitted into a cast-iron shoe, seen in fig. 3. These shoes rest on a wall-plate 21 inches by

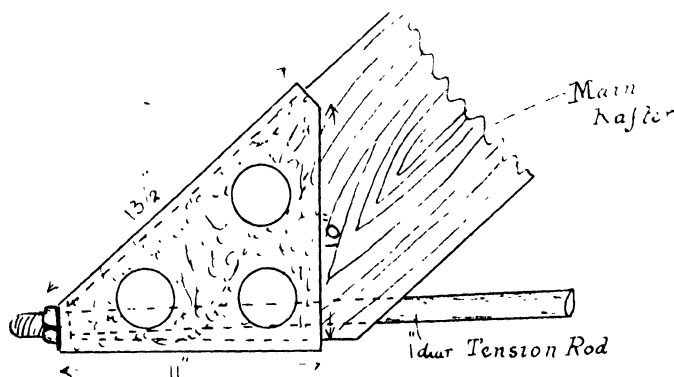


Fig. 3.—Iron shoe at foot of principal rafter.

2 inches thick, whose outer edge is bevelled to the slope of the roof, and to which the end of the sarking is afterwards nailed. The shoe measures 11 inches on base, by 10 inches by 13½

inches, as in fig. 3, and for lightness has three holes on each side. The point of the shoe is flattened to receive the iron tension-rod, which is there tightened up as required.

The top of the main rafter is let into a cast-iron socket $\frac{1}{2}$ inch thick, measuring 9 inches by 10 inches, as in fig. 4. For ease in fitting these top sockets, they may be each made in two pieces and bolted together by four or five bolts.

Through the top of the socket and the rafters is carried a

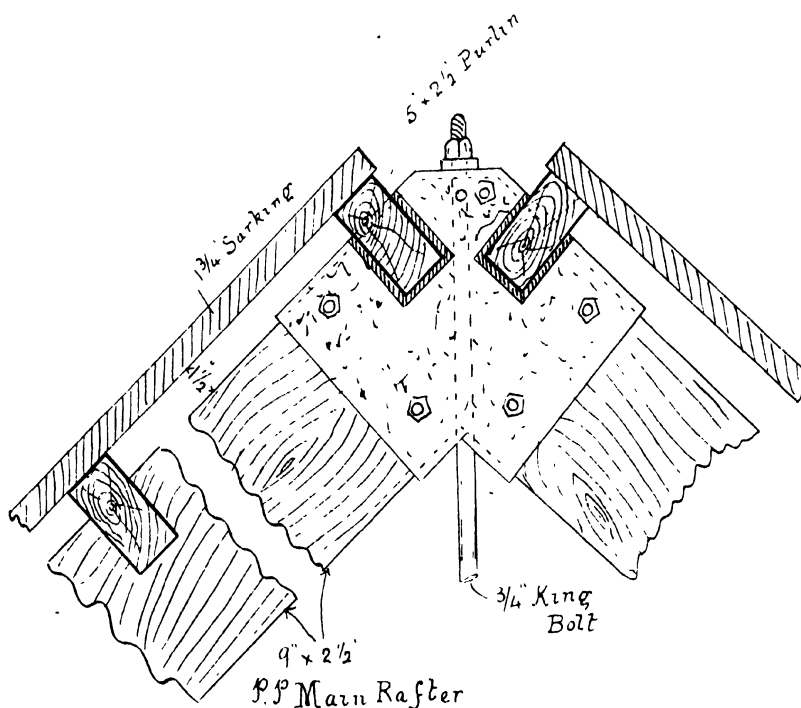


Fig. 4.—Iron socket at top of principal rafters, with purlins and sarking.

$\frac{3}{4}$ -inch king-bolt, which at the other end is bolted through the 1-inch diameter tension-rod, as is seen in fig. 5.

The cast-iron struts are also flattened out at this point and made to fit on to the top of the tension-rod, and have each a hole bored to admit the king-bolt. The whole of these are then screwed up tightly by nuts above and below. The other ends of the struts are bolted to the principal rafter, as may be seen in fig. 2.

After the principal rafters are placed in position the purlins are then checked into the rafters. Fig. 2 shows four rows of

purlins on each side, while the wall-plate on the top of the stone wall serves as a purlin there. For the purpose of ventilation the ridge is left open and two purlins are placed in the top socket, which has iron "lugs" cast on each side to receive the purlins (see fig. 4). These purlins measure 5 inches by $2\frac{1}{2}$ inches, and are checked into the main rafters, as shown on fig. 4.

The sarking is then put on vertically on the roof (see fig. 4), and not, as is usually the case, across the roof. The sarking should measure not less than $1\frac{3}{4}$ inch thick, and this extra thickness is a great advantage in slating the roof, because with this thickness of sarking the galvanised slate-nails do

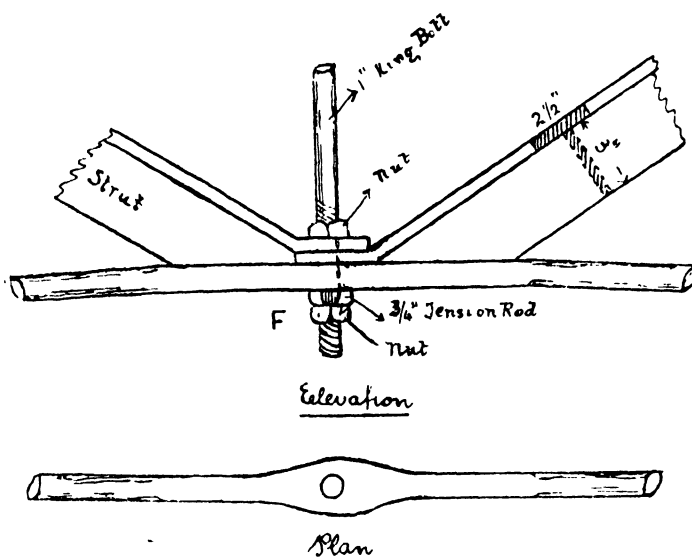


Fig. 5.—Details of iron tie-rod, struts, and king-bolt.

not project through the sarking and become rusted by the ammonia fumes from the stable. The sarking is not carried close up to the ridge (see fig. 4) but left open in order to provide for whatever system of ventilation is decided on.

It is advisable to dress all the woodwork where seen from the inside, and to varnish it with three coats of varnish. This adds to the initial expense, but it greatly increases the "life" of the roof and allows it to be washed down by a hose-pipe.

The roof lights can all be opened together by means of rods and a wheel close to the entrance door. They can be opened as much or as little as is desired, and in this system they are not liable to be blown up by gusts of wind.

Dimensions of Stable.

A stable should never be less than 18 feet wide inside, and if harness is to be hung on the back wall extra width is then required. Stalls are at least 6 feet wide for each horse.

Floor.

The old system of causewaying with stones gathered from the fields is not satisfactory, as it is impossible to keep the floor clean and sweet. Cement also is not satisfactory, at least for the stalls, although it may be used for the passage.

Stable floors should, however, be laid with a concrete foundation, with either granite or whinstone "setts" or hard blue bricks, on the top. For this purpose the floor should be excavated to a depth of about 18 inches and well levelled. A layer of stones (A, fig. 7) should then be put in and broken by hand-hammer to pass through a 4-inch ring in every way, and thoroughly consolidated to a depth of about 6 inches. On this a layer of cement concrete (B, fig. 7) 4 inches thick will be laid, composed of four parts of ballast or broken metal or gravel, two of sand, and one of cement. This should be carefully levelled to the levels required and then receive a coating of fine sand about $\frac{1}{2}$ inch deep, which will allow for any small inequalities of the stone "setts" (C, fig. 7), which are then laid on their edge. The stone "setts" should measure 9 inches long by 4 inches wide and 6 inches deep, and should be selected from an approved quarry, the stones of which wear well and do not become too smooth. All the joints should have a grouting of thin cement well brushed in; the "setts" will then be rammed or bishopped down and grouting again brushed in and the "setts" once again rammed down, while a third or even a fourth brushing of cement grouting may be required to fill up every crevice.

The urine-gutter can be formed in the same way, about 2 inches to 3 inches deep and at least 12 inches wide.

The whole floor may be laid in this way with concrete and stone "setts," or the part between the urine-gutter and the back wall, from D to E on fig. 7, and also a part about 2 feet wide below the manger, also seen in fig. 7 from F to G, may be formed of cement concrete entirely without any stone "setts." These concrete beds are covered with a layer of strong cement not less than $1\frac{1}{2}$ inch thick, composed of one of sand to one of cement, left smooth under the manger but grooved in 4-inch squares in the passage. If this is done for the passage the stone "setts" should be continued about 12 inches or 15 inches

behind the gutter, so that the horses when standing back may stand on the stone "setts" and not on the cement passage with their hind feet.

Drains.

The old-fashioned under-floor drains are now dispensed with. So little urine is voided by horses that drains in a stable are now the exception. The urine is absorbed by the straw or moss litter or sawdust that may be put down. Underground drains were a constant source of annoyance and worry—they were always becoming choked, and were seldom or never attended to.

Floor Levels.

The fall from manger to gutter should be as small as possible—merely enough to prevent urine from collecting in the stall. If left to themselves, horses will choose ground for their fore feet a little lower, rather than higher, than that for their hind ones. In a stable, of course, that is impossible, but it shows that a horse will rest better in a stable where the fall to the gutter is small. The passage behind will be level, or have a slight rise to the back wall, but from one end of the stable to the other there may be a slight fall if required for the contour of the ground.

Ventilation.

Fresh air inlets are usually placed in the front and back walls, and are formed of fire-clay pipes cut to the exact thickness of the wall. Fresh air should, theoretically, be admitted at the floor level, and this can be done in the back wall, as at E, fig. 7, but not in the front wall, where the manger would interfere with it. For the front wall, therefore, the ventilators will be placed near the top of the wall at H, fig. 7, and sloped upwards towards the inside. These may be of 4 inches or 6 inches or 8 inches diameter, according to the elevation and situation of the buildings, and should be covered with galvanised iron gratings on outside and inside, firmly cemented, to prevent the ventilators being closed with straw or hay. These gratings may be made to open and shut on the "hit-and-miss" principle. One opening at least should be provided for each stall in the front wall and one for each stall in the back wall.

To exhaust the vitiated air, ventilators should be placed on the ridge. No perfect ridge ventilator has yet been discovered. If servants could be found to attend to these in a regular manner, the ventilators that can be opened and shut as and when required are certainly to be preferred, and of these perhaps the best is that patented by Mr Barr, sanitary inspector,

Stirling. But unless ventilators can be opened and shut just when required, and this is hardly possible, then it seems necessary to have a ventilator that is always open and acting, and several of these can now be obtained.

Travise.

In every farm-horse stable there are found fixed travises, and not "swung-bales," although with the latter less width in the stall is required.

The travise is generally about $9\frac{1}{2}$ feet long. The hind post is a little in front of the gutter. Travises are made in various forms.

Fig. 6 shows one form, where the heel-post and forepost are fixed in the ground by means of cement concrete. The front ends of travise boarding are quite loose, and merely "butt" against the front wall. The forepost may be carried up and nailed to one of the rafters, although this is not satisfactory, because it tends to rack the roof rafter to which it is attached. The heel-post is grooved to receive the ends of boarding, and the forepost is made in two pieces, bolted together by iron bolts and countersunk nuts.

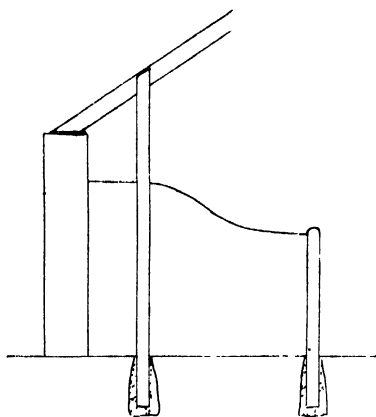


Fig. 6.—*Bad form of travise.*

Fig. 7 is a preferable plan. In this case the heel-post rests on a stone base (K, fig. 7) the top of which stands about 2

inches to 3 inches above the level of the floor. The base is circular, 8 inches in diameter, and is built on a bed of masonry (L, fig. 7), and has a hole 4 inches by 4 inches, checked 2 inches deep out of the top, into which the bottom of the heel-post is placed. The heel-post is 7 inches diameter, circular, and is carried up nearly to the under side of the rafter-ties. Immediately under these ties is a beam 7 inches by 2 inches the whole length of the stable. Between this roof-tie and the top of the heel-post is often placed a small ogee-moulded piece as is seen in figs. 7 and 8. This arrangement distributes any jolting or racking, and does not destroy the stability of the roof.

The forepost is made in two pieces, each 6 inches by 3 inches, and rounded, and after the boarding is put between these two pieces they are bolted together and also fixed to the front wall. These are not carried higher than the top of boarding. Angular shoulder-pieces and side slips, each 4 inches by $1\frac{1}{2}$ inch, are screwed to each side of the planking, and sometimes bolted together with the heads and nuts of the bolts countersunk. The planking is usually 6 inches wide by 2 inches thick, and

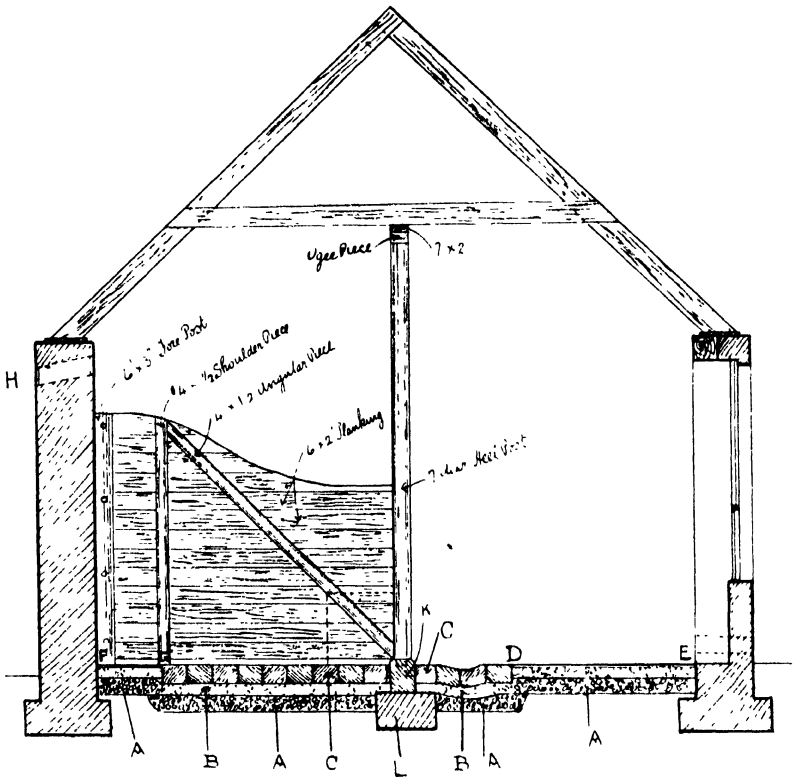


Fig. 7.—Details of stable travise and floor.

sunk 2 inches into a check in heel-post. It is better to keep the planking about 2 inches to 3 inches above the floor level, as this protects it from rotting by coming in contact with the urine on floor. To protect the wood travises from kicking by greasy-legged horses, it is advisable to put sheets of strong plate-iron where shown in dotted lines on fig. 7. In such cases the angular side slip might be omitted entirely.

Mangers.

These may be fitted up either with "splits" for long hay or with closed-in boxes for chaffed food. For long hay, top and

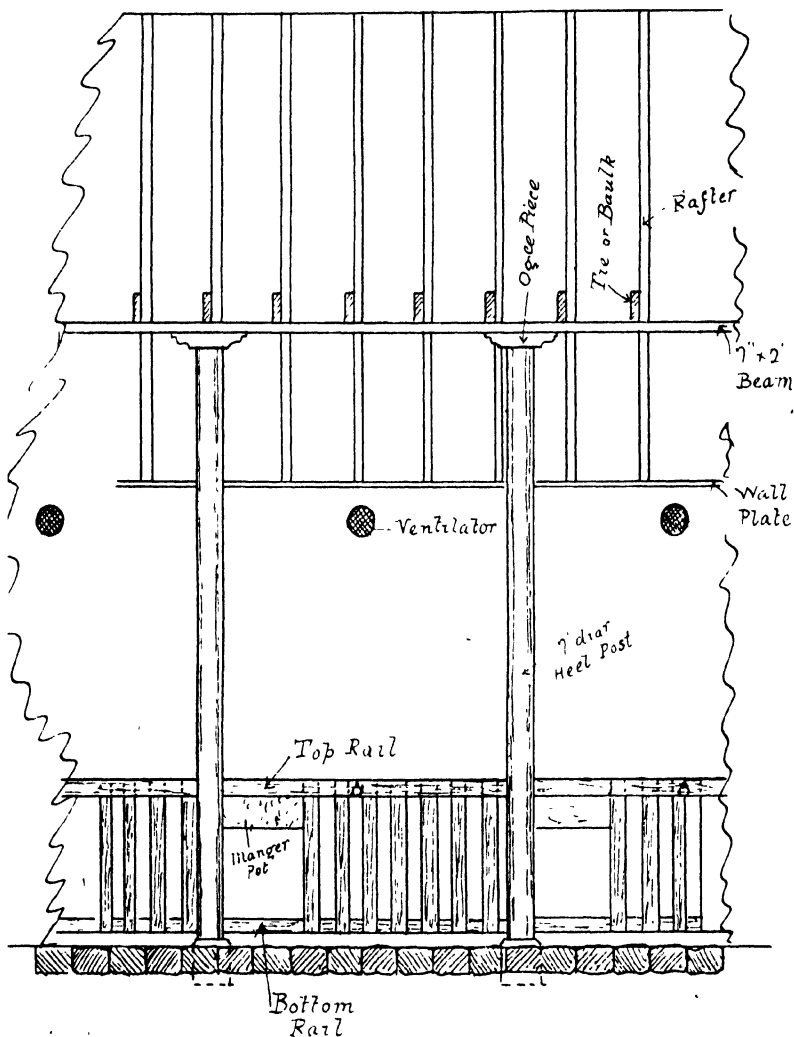


Fig. 8. —Front view of stable travise and manger.

bottom rails should be of ash or elm, 4 inches by 3 inches and 3 inches by 3 inches respectively. The top rail should be checked into each shoulder-piece, and should be 3 feet 3 inches

from floor to top of rail. The bottom rail should be kept up above the floor level sufficiently high to allow hay-seed, &c., to be cleaned out, but not so high as to endanger a horse's foot being caught when rising, &c. The splits are $2\frac{1}{2}$ inches by $1\frac{1}{2}$ inch, and set $2\frac{1}{2}$ inches apart, with all sharp arrises or corners taken off. They should be sunk flush into the inside of top rail. They need not be checked more than $\frac{1}{4}$ -inch into the outside of the bottom rail. Each stall has a fireclay feeding manger, with or without an iron bar across the top of centre. This bar prevents a horse pushing the "feed" roughly to one side, thereby often losing a large part of it. The manger should be carefully fitted all round on top, and a bevelled piece of wood put round the top edge to prevent oats lying between the manger and the wall or travise and causing bad smells.

Each top rail will also have a strong iron ring and staple bolted through the top rail for binding the horse.

The top and sides of the top rail, as well as the top of the travise boarding, will be covered with strong galvanised hoop iron, the full width of the part required and firmly screwed on.

If at all possible, it is a great convenience to have a water manger in each stall. Each water manger will be connected by means of a water-supply pipe, which will be connected to a common water cistern containing water capable of rising to the same level as that of the water mangers. These are therefore always kept full, but require no attention.

A very satisfactory and durable manger is shown in fig. 9. This consists of a 5-inch diameter hollow iron tube for the top rail, which can be got in 12 to 18 feet lengths—long enough for

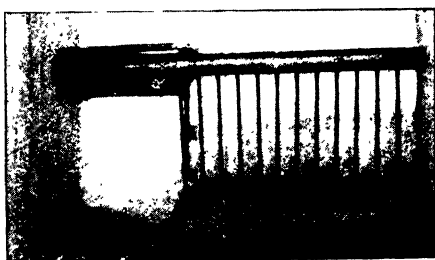


Fig. 9.—Photo of iron manger.

two or for three stalls. These tubes are checked through the shoulder slips, or through the travise planking if there are no slips. The tube is bored on under side with holes at say 4 inches to 5 inches apart. The iron rods are $\frac{5}{8}$ -inch thick, and are inserted in these holes close up to the top of the inside of the iron tube, and are fixed in cement concrete at bottom, with sharp bevel from floor to front wall, as is seen in fig. 9. This throws out all hay-seed and other impurities clear of the rack and allows the manger to be kept clean.

For the binding chain, a hole is bored right through the hollow tube.

To keep the tube in position and also to support the end of fireclay manger a bolt is put horizontally through the tube at the right-hand side of the manger, with countersunk head in the tube, and carried also through the front wall and bolted on the other side of the wall with iron nut and washer. That prevents the tube or top rail being pulled *away from* the front wall. To prevent the rail being crushed *towards* the front wall, a small iron tube or collar is slipped on to this iron bolt between the wall and the top rail.

In another way of fitting up travises, the heel-posts are of iron and as they are hollow, they may be strengthened by filling them from the top with concrete after they are fixed at the bottom, where they are bolted either to cement or stone blocks. The top of pillar has a square flange on which the ogee-moulded piece of wood is placed between the flange and the 7-inch by 2-inch beam running along the under side of roof-ties, and fixed into side walls at ends of stable. Each heel-post has also two harness hooks for convenience in hanging any harness at midday when it is not necessary to take the harness into the harness-room.

The top and bottom ramp rails are of iron, $2\frac{1}{4}$ inches by 2 inches; they are fixed to the iron pillars and built into the front wall. The bottom rail has a shifting piece through which the travise planking can be inserted and taken out to replace a broken board.

In such a case the travise planking is put in vertically.

Hay-Racks.

Hay-racks above the horses' heads are now rightly done away with. They often' caused damage to horses by allowing dust, hay-seeds, and other rubbish to fall into the horses' eyes.

Doors.

Stable doors should be 4 feet 6 inches wide and as high as can be obtained. Many horses throw up their heads when entering or leaving a stable, and if they once receive a hard blow from the door-lintel they never forget it, and become afraid to enter or leave by the door. Doors are safer when made of the sliding type, which is so easy to work with the improved pulleys (such as "Coburn"), for sliding doors, now so common. The sliding rail, for ordinary pulleys should be a plain iron bar 3 inches by $\frac{1}{2}$ inch, turned up at ends and bolted with bolts and nuts and iron washers through the stone wall, and through the wooden safe lintels.

Windows.

Stable windows are usually placed in the wall behind the horses, and should be as large as possible in order to give plenty of light. A stable cannot have too much of this germ destroyer. With walls 9 feet high above floor, a stable window may be 3 feet 6 inches wide by 6 feet high. The lower third part may be made as a "hit-and-miss" window. The inside splits are 2 inches by $\frac{5}{8}$ -inch and $1\frac{1}{2}$ inch apart, checked into hardwood top and bottom rails. The outside splits are $2\frac{1}{2}$ inches by $\frac{5}{8}$ -inch and $1\frac{1}{2}$ -inch apart. Inside beads are screwed, not nailed on, in order to allow inside splits to be taken out when required. The upper two-thirds of window will be glazed with 16-ounce sheet-glass or rough plate-glass. Complete windows of this type may now be obtained of iron, but they are usually too small.

There should be no sole board or press below window as the top will be sure to be covered with "odds and ends," thus blocking up the ventilating part. The wall below window should be made thinner, forming a recess in which water-buckets, &c., can be placed (fig. 7). Sometimes the upper third part of the window may be made to open. It is hinged at the foot and made to open inwards by a quadrant and ropes. Several opening roof-lights should also be inserted in the roof for light and extra ventilation.

Harness Pegs.

In many cases the harness is all hung in the stable, with consequent deterioration to the harness. Wherever possible a small harness-room should be provided in close proximity to the stable, where a slow-combustion stove can be kept burning at a very small cost. The walls and ceiling of harness-room should be lined with 3-inch by $\frac{3}{4}$ -inch or $\frac{5}{8}$ -inch linings, grooved, tongued, and V-jointed, and varnished with three coats of best varnish. The floor should be of cement. This room should also be well ventilated. Here horse-rugs, men's coats, &c., can be dried after a wet day.

The usual form of saddle-rack is not a good one—viz., two long boards stretching the full width of each pad of the saddle, because the saddle-pads, pressing against these boards, get no chance of drying.

The design in fig. 10 is better. This does not touch the padded parts of the saddle at all, which are thus free to the air, and in a heated harness-room will soon dry and be softer to the horse's back next morning.

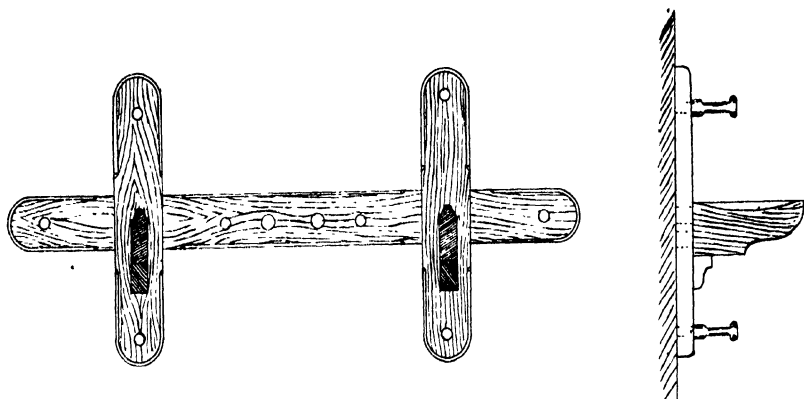


Fig. 10.—*Front and side views of harness pegs, &c.*

Corn-Chest.

Corn-chests are now easily obtained of galvanised iron, with or without divisions for oats, bran, peas, &c. They should have padlock and key, and each horseman should have one chest, as many men, out of kindness to their horses, have been known to feed their horses from their neighbour's chest if each one is put—as should always be the case—on a fixed ration per week.

Recesses.

One or two recesses should be left in the walls of a stable in which presses may be fitted up to hold brushes, combs, &c.

Hay-Loft.

Under no circumstances whatever should a hay or any other loft be allowed over a stable.

GOATS: THEIR USE AND MANAGEMENT.

By H. S. HOLMES PEGLER, Honorary Secretary, British Goat Society.

History of the Goat-keeping Movement.

FORTY years ago, when I first took up goat-keeping as a hobby, the goat as a source of milk was comparatively unknown, and was seldom seen except on commons, or at seaside resorts, dragging children about in miniature carriages. As regards literature,

nothing had been published in the English language on the subject, and only brief paragraphs were devoted to it in the encyclopædias.

Changes are frequently due to some trifling circumstance or event, and so it happened in this case. Some one wrote in 1873 to the editor of a paper which had made its appearance not long before, and is now known as 'The Bazaar, Exchange and Mart,' asking for information as to the treatment of goats, the question being answered by the present writer somewhat in detail. The following day a letter was received by the author from the editor asking for a series of articles on goat-keeping for the journal in question. Those articles duly appeared, and were afterwards reprinted in book form, under the somewhat too comprehensive title—at that stage—of 'The Book of the Goat.' This work, however, has been twice rewritten, greatly enlarged, and now represents a volume of some 320 pages.

It was shortly after the appearance of this book in its first incomplete and unpretentious form that a letter appeared in 'The Echo' from the pen of the late Baroness Burdett-Coutts, calling attention to the misuse of she-goats as draught animals at seashores, when they are so much better adapted for supplying milk to the children they draw about. An editorial article on the subject was the sequel to this letter, and a good deal of correspondence followed. Shortly after prizes for goats were offered by Lady Burdett-Coutts at a small agricultural show at Newton-Abbot, in Devonshire, and this was followed by a very large display of these animals at the Crystal Palace in the summer of 1875.

In the following year the first Dairy Show at the Agricultural Hall, Islington, was held, and here again goats figured prominently before the public, and have continued doing so in the same building ever since. It has been greatly owing to these shows, and the milking competitions which are carried on there, and are always freely reported in the press, that the attention of the public to goats and their utility as milch stock has been so prominently directed in the last thirty-five years. The interest thus evoked in goats in this country in course of time spread to some of the colonies, chiefly the Islands of the West Indies, and more recently to Canada and America.

In several parts of the United States goat-keeping is now being extensively practised, and goats are in great demand, supplies being drawn partly from England, but mainly from Switzerland, where the best milch-goats are to be obtained. In America, indeed, the question of goat-keeping as a milk supply has been regarded of such importance* that in 1905 an official from the Bureau of Animal Industry was deputed by the Secretary of the U.S. Department of Agriculture to visit

Europe and to take steps for importing selected specimens. The result of this visit was published in a handbook issued by the Department, entitled 'Information concerning the Milch-Goats,' which has run through several editions.

British Goat Society.

In 1879 the British Goat Society was started in England, and under the influential patronage and encouragement of the late Baroness, previously referred to, the movement was supported by many members of the aristocracy and well-known country people, who took up goat-keeping, partly as a hobby, but also as an encouragement to the cottagers on their estates, which was one of the first objects of the Society. Some of the earliest presidents who took active steps in this direction were the second Duke of Wellington, Mr W. J. Evelyn of Dorking, and the Earl of Rosslyn; these having been followed since by many others. Two of the most energetic and successful members at the present day are Lady Acland of Killerton, Exeter, and Lady Dunleath of Ballywalter Park, Ireland.

In course of time a Herd-Book was started and issued in Parts, four of such parts constituting a volume. Up to the present seven parts have appeared, and the eighth is in course of publication. The Herd-Book proper is divided into three sections, the Anglo-Nubian Section, the Toggenburg, and the General Section; but the book also includes the Prize Record.

With the establishment of small holdings the demand for milch-goats is largely increasing, and the great difficulty now is to find the improved goats to keep pace with the demand.

The Goat as a source of Milk.

The goat is an animal that is well adapted for the supply of milk to cottagers and small holders in country districts where cow's milk is often only procured with difficulty, and where cow-keeping cannot be carried out for want of accommodation. It is an animal which needs no elaborate structure for its habitation, as a mere hut will shelter it, nor does it require grass land as pasturage. Like the pig, it converts waste material into valuable food, but, in the case of the goat, a food which cannot well be dispensed with, and which to children is an absolute necessity. Its milk is not only extremely abundant in proportion to its size, but it has the merit of being both more nourishing and more digestible than cow's milk. All these qualities render the goat a most necessary adjunct to rural economy.

It is not in England alone that the domestic goat has its advocates; writers in France, Germany, and Switzerland are equally loud in their praises of this animal, and all are united in their efforts to increase its popularity.

For many years the prejudice against goat's milk in England was such that it was with difficulty people could be induced to even taste it. With the advance of knowledge, as a result of the dissemination of literature on the subject, this prejudice is gradually being overcome, and people who have once tried the milk for domestic use are very loath afterwards to dispense with it. But I shall have more to say on this point when writing on goat's milk.

BREEDS OF GOATS.

Speaking generally, but four distinct types of goats are to be met with in Great Britain: the common goat, of which we have two varieties, the long- and the short-haired, known respectively as English and Irish; the Swiss, represented chiefly by Toggenburgs; and the Anglo-Nubian, originally a cross between the Nubian or Indian goat and the English.

English and Irish Goats.

Goats commonly known as English are more or less mongrels, for the following reason: In times past, when these animals could be freely introduced into this country, they were frequently landed at our various ports from steamers and yachts, where they had been used to supply milk during the voyage. A large proportion came from India and Malta, and these on being crossed with local stock left certain characteristics in the progeny, some of which can be still detected at the present day.

The Irish goat is a flat-sided and often shaggy-haired variety, with a long head, heavy beard, and long horns, growing more or less perpendicularly, but inclining to the rear. Drovers of these are brought over to England every year, and sold by itinerant herdsmen at the markets of most of our country towns. These, mixing their blood with the short-haired kind, leave a nondescript animal as a result, so that it is seldom that an English goat, true to type, is encountered.

The true English goat may be described as follows: Head short with ears erect, though frequently taking a horizontal position, horns inclining to the rear at first and then turning outwards, facial line slightly concave, with prominent frontal bone. When the outline is convex and the ears have a tendency to drop it is a sign of some Eastern blood being present. The coat is more or less short—in summer distinctly so, but

hair is often longer at the hindquarters. The female—and it is this I am particularly describing—has, as a rule, a beard, though, as in the case of the horns, this appendage is occasionally absent.

The Scotch Goat.

The goat of the Lowlands of Scotland is very similar to the English variety, but there are said to be herds kept in a semi-wild condition in a part of the North-West Highlands which differ somewhat. These are small in size, standing at the shoulder less in height than the Highland sheep. They carry a somewhat shaggy coat of various colours, but white generally predominates, many being piebald. The head is light, with the forehead prominent, and having a tuft of hair upon it, which in the male is of some length. The ears are small and erect. The horns curve backwards and outwards, and in the male are large and massive—in fact, the general appearance of the head resembles that of the ibex or wild goat. These goats are poor milkers, giving at most but a pint a-day, and are kept more to kill for food than for dairy purposes.

Swiss Goats.

There are in Switzerland several breeds of goats, being originally selections from the Alpine or common goat of the mountains. In the Toggenburg and Gessenay districts in particular, the goats have been bred true to type for many generations, and always with a view to milk production; so that Swiss goats are in great demand the world over, and large numbers are imported every year to neighbouring countries of Europe and also to Canada and the United States. As I am restricting my observations on breeds to such as are met with in England, I shall only discuss two Swiss varieties.

The Gessenay or Saanen.

This is a breed of large size, and uniformly white or cream-coloured. A few were introduced into England some years ago, but hardly a specimen is left pure at the present day, though crosses with the Toggenburg have produced progeny which, when white, can hardly be detected from the pure breed. There is no doubt that with the next importation (which only awaits the necessary facilities from the Board of Agriculture and Fisheries to be carried out), a considerable number of goats of this variety will be brought into this country.

The description of the Saanen is as follows: Head large and

devoid of horns, wide at the forehead and somewhat coarse and heavy at the muzzle; ears rather long and held horizontally as a rule, but occasionally pricked; neck very long and slender, with two tassel-like appendages under the throat; considerable length and depth of body and width across the loins, with hip-bones set well apart; udder large but round rather than long; the hair is more or less short, but there is always longer hair down the spine and on the flanks, whilst many show a fringe on the forehead; the beard is long in both male or female, but exceptionally so in the former. The goat selected for the illus-



Fig. 11.—Mrs Straker's "*Leazes Eve*," of the Saanen type; the Champion She-Goat for 1911.

tration of this breed is not a pure specimen, but shows its most important points. It has the special merit, however, of representing in perfection the type of animal which is most popular in the show ring, being, moreover, the champion she-goat and milking cup-winner at the Dairy Show, 1911.

The Toggenburg.

The description above given of the Saanen applies generally to the Toggenburg, with the exception that this breed is smaller and the colour different. In this the Toggenburg is

peculiar, for it has a colour and markings entirely its own; it may be best described as mouse-coloured, or a light slate colour, whilst the white marks are distributed thus: On each side of the face there is a streak which extends upwards from the muzzle to, and often including, the ears, the insides of which are also frequently white; similar marks are displayed on each side of the tail, whilst absence of colour again predominates under the belly, between the thighs, and from the knees down to the hoofs.

The Toggenburg should be short-haired—at least that is a



Fig. 12.—A Toggenburg Goatsling, the property of Mr W. A. Wilcox.

recognised feature in England, though in Switzerland many long-haired and distinctly shaggy animals of this breed are met with, and some breeders there prefer this form as a greater protection from cold. The head is somewhat long, and it should be free from horns, though these may be occasionally observed. Such animals in the Toggenburg valley would be destroyed as soon as any sign of a corneous growth became apparent, but with us this goat is too rare and valuable to be wasted in this manner; and so the horned Toggenburg is allowed to live and propagate this defect, though specimens of this description command lower prices.

The Toggenburg was first brought to England about 1884,

since when there have been various importations, picked specimens as milkers being in every case selected, so that in almost every instance the progeny of these animals and a large proportion of their descendants—the results of crosses with our British goats—have proved themselves especially valuable as milk producers. This has made the Toggenburg extremely popular; and it is further a general favourite on account of its remarkably docile and affectionate disposition, delighting to be fondled and caressed.

I have dealt rather fully with this breed and been particular in describing it, not only because of its popularity, but on account of the numerous attempts made by unscrupulous persons to palm off on the uninitiated common goats as Toggenburgs, without even having any points of resemblance to them. No Toggenburg should be bought without a pedigree, all pure specimens being registered in the Toggenburg section of the British Goat Society's Herd-Book. Some of these goats have fetched as much as thirty-five guineas each, and it is seldom that one can be obtained for less than £10. A record in this respect was reached when a Toggenburg breeder sold at the Dairy Show in 1909, two goats and three kids for no less than ninety guineas—one goat fetching twenty-five guineas, and her kid fifteen guineas. These were bought by the Congested Districts Board of Ireland for improving the stock of Irish goats for cottagers. The illustration (Fig. 12) depicts a handsome young she-goat of this breed from the herd above-mentioned.

The Anglo-Nubian.

This goat is of quite a different type to that last described, and of larger size. It was originally produced by crossing the common English with the imported goats from India, the term "Nubian" being somewhat of a misnomer, although the characteristics of the genuine Nubian are almost identical with those of the Indian. From being at first a cross, the Anglo-Nubian has developed into a breed, and has now a separate section assigned to it in the Herd-Book. It can always be identified by the following points: A short head, terminating in a very narrow muzzle, with little or no beard, and with the facial line more or less arched; ears long, wide, and distinctly pendulous, though at times only half-lopped; horns short and inclined to be recumbent, but also turning outwards at the extremities; a close coat, rather long legs, and slender neck are also features more or less common to this breed, though not so generally noticeable. Except in one or two particular strains this goat is not so good a milker for quantity as the Toggenburg and some other Swiss breeds, but in quality

it is decidedly superior, showing butter-fat frequently in large proportions.

The late Baroness Burdett-Coutts was one of the first to take up this breed and improve it for milk production, and the Holly Lodge herd became famous to English-speaking goat-keepers throughout the world. The best goats in the West Indies at the present day are descended from selections from that herd, exported to Barbadoes many years ago. After the

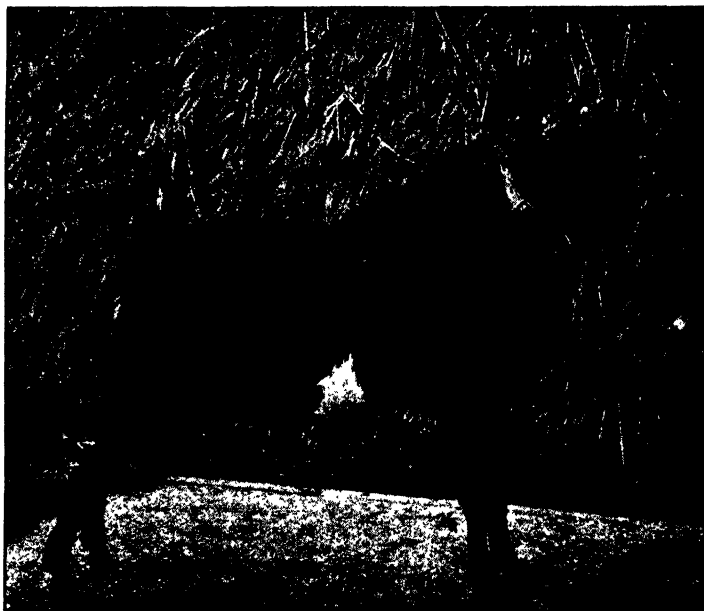


Fig. 13.—*Anglo-Nubian Stud Goat of the old-fashioned kind; typical of those in the herd of the late Baroness Burdett-Coutts.*

death of the Baroness in 1906 her unique collection came under the auctioneer's hammer, and was dispersed to various parts of the kingdom—goats and kids realising an average of £12, 10s. a-piece (see illustration, Fig. 13).

MANAGEMENT.

Hints on Selection.

Many people have an idea that there are such things as "fancy goats" in the same sense as there are fancy pigeons, and that the exhibits at shows which win prizes are of this

description. It should, therefore, be understood that ever since the movement was started for improving the breeds and fixing a standard of points, two objects alone have been sought—viz., to increase size and improve the form for milk production. The first was necessary, because goats were in the early days stunted in their growth from being allowed to mate when only half-grown. This practice was eventually discouraged, and a proper size was attained, when the art of the breeder was devoted more to the improvement of the form for symmetry and comeliness, but ever keeping to the front the particular points regarded as essential to abundant milk production. Colour and markings have therefore always been ignored, except in the Toggenburg, which cannot be maintained in a pure state without due regard to this particular characteristic.

Age for Mating.

The early age at which mating takes place amongst the genus *capra* is extraordinary. A she-goat may be successfully served by its own male kid before the latter is fully weaned, that is to say, at three months old; and a she-kid has been known to accept the service of the male when between three and four months old. The natural rutting season commences in September and continues until January, the period of gestation being twenty-one weeks. Goats that are stall-fed with corn often come in season at other periods of the year, so kids may appear in almost any month, but much less frequently in July, and from thence to the end of the year.

The best age at which to mate a "goatling," i.e., a she-goat over one and under two years old, is at about fifteen months; but this is not easy of accomplishment, as most kids are born in March and April. Fifteen months from that period brings them into June and July, when service, if it should take place at all, is rarely effectual, and they have to be kept over till September. Size is gained by this, but time is lost, so it is a common practice to get kids as early in the year as possible, and have them served in January or February of the following year. This is not detrimental to future milk production.

Selection of the Male Goat.

In the selection of the male goat the breeder looks for the following points: size is here an object, and the animal should measure at the withers not less than 31 inches if over two years old and of the Anglo-Nubian breed, or 30 inches if a Toggenburg. It may here be mentioned that some prize-

winners have attained a height of 35 and even 36 inches. Other points are: a short head, with plenty of beard, but preferably without horns; a massive neck and chest well covered with hair, straight firm limbs, a long deep and level body with well-sprung ribs and square hindquarters. Withal the animal should have a thoroughly masculine bearing, and this a good "Billy" can exhibit in a very unmistakable manner. Pedigree is a necessary consideration, and it is a further feature of importance in a male if it can show milking prize-winners amongst its more immediate ancestors. The accompanying illustration (Fig. 13) of an Anglo-Nubian depicts the points here given in a very satisfactory manner. This animal will be seen to possess a dew-lap which adds considerably to its masculine appearance, and the expression is such as to suggest aptitude for stud purposes.

Selection of the Female Goat.

The she-goat should have a long and deep body, well-sprung ribs, and a fairly level back, with the hip-bones set well apart. The head should be devoid of horns, neat and tapering, and well-set on a long slender neck. The udder should be capacious, and with teats of good shape and of a size easily grasped in the hands, whilst its skin should be thin and supple. The coat should be smooth and glossy throughout, and in texture like that of the udder, soft and pliable. These features are represented to perfection in the animal here portrayed, "Leazes Eve" (on page 57), a partly-bred Saanen previously referred to, the property of Mrs J. C. Straker, of the Leazes, Hexham. This goat carried off everything before it in 1909 and in 1911, finishing the season by winning at the London Dairy Show the 1st Milking Prize, the Champion Cup, and the Baroness Burdett-Coutts Cup, as the best by inspection and milking.

A Stud Goat Register.

In connection with the selection of male goats for breeding, it may be stated that the British Goat Society publishes annually a Stud Goat Register Circular, in which are entered animals that have been accepted by the Committee as adapted by appearance and pedigree for improving the breed for milk. One or more of such goats are stationed in as many different counties of England, Scotland, and Ireland as possible for the use of members and others, at certain prescribed fees. This Stud Circular is issued annually in September, and gives full particulars, with pedigrees of each entry.

Treatment of Kids.

A goat usually gives birth to a couple of kids, except on the first occasion, when, frequently, one only is dropped. Later it may have triplets, whilst as many as four and even five have been produced at a birth; but this is uncommon, and, moreover, a decided disadvantage. When there are more than two, the kids are likely to be small, and it takes a good milker to properly nourish a larger number. The kids can be treated in precisely the same manner as lambs, except that they cannot stand cold as well as these animals. When there are more kids than the dam can suckle properly, they can be put on



Fig. 14.—*Kids' Playground.*

a foster-mother or brought up on the bottle, when they become exceedingly tame and affectionate. Weaning should not begin to take place before the kid is two months old if it is expected to grow to any size, but it may be weaned completely at three months or even ten weeks. There is no surer way of obtaining fine stock than by letting the kids suck as long as their dams will allow them, but it is of course not economical; and when, as often happens, a couple of guineas is given for a young goat at three months it is not more than it has cost to produce, taking into consideration the service fee for the dam, which runs high in pedigree stock, and the cost of the milk consumed by the kids up to the time of weaning.

From the time a kid is born, and for six months afterwards, it should be allowed its freedom to gambol and play. It is

decidedly cruel to tether a young and agile animal like this that needs exercise for its limbs. But apart from this the antics of a couple of kids are extremely fascinating and entertaining. Provided with a log or length of timber of any kind, raised some three or four feet from the ground like a bridge, these youngsters display wonderful agility in jumping on and off. They will mount, one at each end, and meeting in the centre, will butt each other in play until one or both tumble over. Similarly the activity and sure-footedness they exhibit when an opportunity occurs, clambering along the roof of an outhouse, and running along the ridge, is wonderful to behold. The accompanying illustration (Fig. 14) shows an arrangement of timber for providing young stock with means for exercising their limbs. Kids of different sexes may run together in the spring, but it is unsafe to allow this in the autumn on account of their extraordinary precocity, as already explained.

Pasturing.

Pasturage, as previously stated, is not essential to a goat, and in some circumstances may even be prejudicial to it. It is a common error to suppose that one of these animals will keep down the grass of a tennis lawn or cricket pitch or any ground that is much trodden on. No creature is more particular about the cleanliness of its food—at least according to the experience of goat-keepers in England, though a different account is given of the goats in Malta. Pasturage to suit a goat must be short and sweet, like that upon downs and mountain slopes, the rich pastures of alluvial soils which fatten cattle being absolutely harmful to these animals. Pedigree stock of high breeding are always more delicate than common kinds and need different treatment, and this applies essentially to goats. For these reasons pasturing from October to February or early in March is decidedly detrimental, especially as these animals can seldom be allowed a free range.

Tethering.

There is no denying the fact that a goat is an essentially mischievous animal, and will often eat shrubs and plants, for which it has no particular liking, apparently for the mere pleasure of doing damage, which it seems to thoroughly realise. The weak spot in a hedge is quickly discovered if there is anything growing on the other side that it fancies; the animal will work its way through some narrow opening in fence or palings in a manner that would appear impossible to any one who has not witnessed it. For these reasons either a

"puzzle" must be hung round its neck, consisting of three strong saplings, or preferably bamboo rods, fastened in the form of a triangle with ends projecting, or a tether must be brought into requisition. This must be thoroughly strong or it is useless. Cord should never be used: not only does it rot after being dragged through wet grass, but it kinks and shortens and the animal gets entangled in it. A light but well-made chain, about 12 feet long, must be used, to each end of which should be appended a springless hook or double shackle with swivel attached, or a spring hook may be used at the collar end. One of these hooks connects with the goat's collar or head-stall and the other with the tethering pin, which must be of wrought iron and about 18 inches in length. The tether requires to be shifted two or three times a-day according to the abundance and extent of pasturage.

The Goat-house.

Goats require to be housed at night throughout the year, and during winter on most days they are much better indoors and stall-fed than tethered out in the cold. Indeed, with highly-bred goats this is a necessity, and therefore a suitable goat-house should be provided. Where only one or two goats are kept, the stall of a stable can be very well made to answer for a goat-house, and all that is necessary is to provide a plain wooden bench, raised a couple of feet from the ground, on which they can repose, as is done with a kennel of dogs, together with a feeding-board and hay-rack as described below. Goats prefer this to a straw-littered stall.

Where there are several goats, however, they cannot be herded together like sheep, for those with horns are sure to employ them as weapons against those without, and even those that are hornless are apt to be aggressive with their neighbours. In such cases the goat-house must be fitted with miniature stalls, as shown in the illustration of Mr Ravenscroft's goat-house (Fig. 15). These stalls must be from $2\frac{1}{2}$ to 3 feet wide and in height about 4 feet at the head of the animal, sloping to 3 feet at the tail part. Instead of a manger a deal board 11 inches wide and 1 inch thick should be fixed along the front of the stalls, with circular holes cut in it to allow a small pail (like those used by children at the seaside, but of the larger kind) being dropped down nearly to the rim. Above the board, and extending along its entire length, a hay-rack should be fixed, the bars of which should not be wider than from $1\frac{1}{2}$ to 2 inches apart. This is important. These bars may be either of iron or thin bamboo canes. There should be also a few enclosed stalls

similar to those shown on the right in the illustration. These are required for goats kidding or for kids.



Fig. 15.—Mr B. Ravenscroft's Goat-house at The Noke, St Albans.

Stall-Feeding.

It is a special feature of goat-keeping for the home supply of milk that the animal can be kept entirely or almost entirely stall-fed with nearly as good results as if tethered out. Indeed, as regards the health and longevity of the goat I might say *better* results. There are many people who could keep a couple of goats with nothing more in the way of accommodation than a small outhouse and a kitchen garden. The writer began in this manner himself, and an American enthusiast at Buffalo, U.S.A., tells the same tale. Although years afterwards I had for a time the advantage of a large common for my goats to roam over, and later acres of pasturage attached to my house, my milch stock never did better or were healthier than were the two "nannies" which supplied my first goat dairy, whose habitation was a mere outhouse.

In the elaboration of milk from food, rest, quietude, and warmth are important factors. Hence a goat in its stall which eats a variety of fodder, chews the cud, and sleeps or at least lies down peacefully and contentedly, is in a better position for supplying an abundant yield than one tethered in the open.

In the latter circumstance it has only grass before it, and that for a great part of the time trodden and soiled by its own feet. It may be subjected to a burning sun, cold wind or driving rain, when it will continue to run round its peg bleating to be let loose or brought under cover. Such conditions are distinctly unfavourable to milk production, and if the poor beast is tethered on a public ground, such as a common, it is liable to be ill-treated or milked by mischievous boys.

I should here remark, however, that this kind of life is not natural to a goat with its active roaming disposition, so that one that has been accustomed to its freedom is not likely to do well for a time under the stall-feeding system, especially during summer. Like most other domestic animals, however, goats are creatures of habit, and if reared under this arrangement it readily accommodates itself to it for the rest of its life if necessary.

Garden Produce, &c., as Fodder.

It is a particular feature in favour of goat-keeping that where a good-sized kitchen garden is provided there is during three-parts of the year an abundance of waste vegetable refuse that can be utilised and turned into milk. To enumerate a few items, I may mention pea halm after the plants have ceased to be productive—a capital fodder for milk production; the stems and leaves of the cabbage tribe, the prunings of fruit and other trees and bushes; ivy, privet (but *not with the berries on*), the crisp dried halm of ripened potatoes, the tops of carrots and the peelings of all vegetables used by the cook, who can also contribute bits of dried bread and toast and the scrapings of the porridge-pot, so long as these are not greasy. As with human beings, goats have their likes and dislikes, and some will eat what others refuse, but taken altogether it may be said of the goat that nothing of a vegetable character comes amiss to it, from a newspaper down to the contents of your tobacco-pouch. Years ago a herd of Pyrenean goats were driven daily through the streets of London and milked for customers as they had been used to be in the south of France, from whence they came. The food of these creatures consisted chiefly of the paper and paste from the advertisement hoardings whenever they could get access to them, and they seemed to thrive on it.

Rations.

Stall-fed goats should receive at least three meals a-day, though four are better. The first should be given as early as possible before the owner has his breakfast, and may consist of

a double handful of hay and a pint or pint and a half of mixed oats and bran. At eleven or twelve, and again at four or five o'clock, some of the various kitchen or garden scraps above enumerated, and the last thing at night a repetition of the early morning feed, this giving the least trouble to provide.

Hay must be supplied carefully and corn sparingly, the former because if given recklessly it only gets wasted by the animal selecting the choicest morsels and leaving the rest to fall at its feet as it is pulled through the bars of its hay-rack. This is most important if the goat is to be kept economically. Corn is not a natural food for a goat, and if given in abundance, apart from the question of cost, it is injurious, being apt to make the stall-fed animal accumulate fat and become unhealthy, often causing an eruption on the skin. This applies particularly to such corn as barley, wheat, and maize. The first two should never be given, the last only occasionally as a change from oats, and then always crushed. Bran is good for milk, and now and then for a further change—and there is nothing a goat likes better than variety in its meals—bits of oil-cake (linseed) or a chopped up mangel or swede dusted over with sharps or pollard.

If the goat-keeper possesses an enclosed yard as well as a kitchen garden, it will pay him to get in the loppings of trees for the animals to bark. This for them is not only a source of nourishment but a fascinating pastime, as will be quickly proved should they by chance get access to young growing trees on their own account.

Where there are open sheds that can be spared in part for this purpose branches of trees may be collected in the autumn and stored so that the dried leaves may be eaten as well as the bark. Acorns should also be collected when the crop is abundant, but these should be supplied cautiously.

Water in any quantity is only necessary to goats giving milk, but it should be offered at least once daily, and rock-salt in the rack or feeding trough should be always accessible.

GOAT'S MILK.

It is a singular fact that whilst the demand for goats continues to increase annually there is no real sale for the milk on a commercial scale. Those who desire a supply of this commodity seem to insist on obtaining it from their own goats, and object to purchase it from the milkman who supplies the ordinary cow's milk. This may possibly be partly on account of the expense, as goat's milk sells at a much higher price than cow's milk, fetching from 8d. to 1s. a quart, also because this milk requires to be consumed when quite fresh. A large and

well-known dairy company in London at one time established a goat farm on the Surrey hills with the idea of securing regular customers for the milk, but the demand was insufficient to make it profitable in the summer, and in the winter the scarcity of goats in profit rendered the supply unequal even to the small demand.

Doctors' Opinions.—There can be little doubt that if the medical profession as a whole were as enthusiastic on the value of goat's milk for infants and invalids as are those few amongst them who keep goats themselves, and have therefore a practical acquaintance with its worth, the article in question would be much more sought after. I am constantly receiving letters, not only from goat-keepers amongst the general public but from members of the medical profession, giving instances within their experience of the extraordinary benefits which have accrued from the use of goat's milk with delicate children, in many instances saving infant life.

Unfortunately, however, now and again, from some unknown cause, a medical man will go out of his way to actually denounce goat's milk. This was the case some years ago when Dr Freyberger, pathologist to the London County Council, is reported to have said at the inquest on a child ('Daily Telegraph,' August 15, 1906), "Goat's milk is worse than skimmed milk, and does not contain sufficient fat and sugar," a statement so utterly at variance with facts as proved by analysis that it cannot be too often refuted.

Another instance of extraordinary ignorance of the subject exhibited by one of the faculty who went out of his way to write upon goat's milk in an article headed "Doctor's Advice," which appeared in several country newspapers, has been brought to my notice whilst writing this treatise. I select passages from this erroneous statement in the hope that those who may have read or heard of it may have an opportunity of comparing what is there said with the facts and figures, based on scientific research and the experience of other members of the profession, to be seen below.

"... The milk has no anti-tuberculosis virtues. It is said to be more easily digested than cow's milk, but there is nothing in its composition to warrant this assertion, and proofs are not convincingly in its favour. Since enjoyment of an article of diet contributes to the readiness with which the stomach deals with it, and goat's milk is so strongly flavoured as to arouse aversion in many folks, the question of digestibility may be left open. Each individual must settle it for himself. As regards its food-value, this milk cannot equal cow's milk in any of the more important elements; its sole advantage lies in a slight superiority in mineral matter. It is not suitable for babies."

It will be seen by what follows that there is a great deal in the composition "to warrant the assertion," and that proofs, as supplied by scientific investigation, are most convincing. Similarly is digestibility explained on scientific grounds, as well as proved by the experience of medical men in general, so that it is by no means an "open question." As to the food-value being below that of cow's milk, analysis gives the lie to this in an unmistakable manner.

Scientific men in France and Germany seem to have devoted more attention to this subject than their English confrères. Some useful researches have been instituted by Dr Demade in Belgium and by Dr Barbellion in Paris. At the International Congress of Medicine in the latter city the doctor referred to explained why goat's milk is more digestible than cow's milk in the following terms: (1) That whilst the curd of cow's milk forms a dense, adhering mass, which by agitation separates into clots that are but slightly soluble, the curd of goat's milk on the other hand forms into very small, light flakes, which are soft, very friable, and very soluble, like those in the milk of the ass and in human milk. (2) The curd in both human milk and in that of the goat after agitation is precipitated very slowly and incompletely, while the curd of cow's milk is precipitated very rapidly and very thoroughly. (3) Submitted to the action of digestive ferments, human milk and the milk of the ass and the goat were digested completely in twenty hours, whilst the same process applied to cow's milk showed only a very slight advance after sixty hours. (4) The milk of the goat approximates more in its composition and digestibility to human milk than that of any other animal.

The only English authority to my knowledge who has offered any explanation on the same subject is the late Dr Augustus Voelcker. This well-known analyst, who was for many years connected in that capacity with the Royal Agricultural Society of England, in his report on the analysis of samples of goat's milk, published in the Society's journal, wrote as follows: "The cream globules in goat's milk are smaller than in cow's milk, and as the milk is more concentrated the cream globules are contained in goat's milk in a more perfect state of emulsion than in cow's milk, in consequence of which hardly any cream rises to the surface on allowing goat's milk to stand at rest for twelve hours or longer. One of the samples threw up scarcely one per cent of cream, and the others none at all on standing twenty-four hours."

This question of size in the butter-fat globule, as being an important factor in estimating the value of goat's milk and its approximation to human milk, has since been under investigation in the United States. Dr J. A. Hornsby, writing in an American journal as recently as last December, said: "Two

years ago the Michael Reese Hospital of Chicago undertook a scientific study of milk in connection with the sick children's department of the hospital. All kinds of milk entered into the test—mother's milk, wet-nurse's milk, asses' milk, goat's milk, and milk from the various breeds of cows. Elaborate chemical analyses were made and comparisons drawn. . . . It was found, a fact long known, that mother's milk is not very rich in butter-fat, but it was also found that the butter-fat globules were almost infinitesimally small, and so intimately mixed with the milk that even the highest power separator or centrifuge could not separate the cream from the milk." Thus the physiological properties of goat's milk are closely associated with those of human milk.

The British Goat Society in its early days made quite a collection of the reports of doctors on the value of goat's milk as a food for children, which were published in a leaflet. This is now out of print, but I may quote from that collection the words of Dr Hewitt, of Montpelier, Cheltenham, who wrote the following: "I fully agree with Dr R. J. Lee's estimate of the superior value of the milk of the goat, and can write positively as to the advantage of the same for the nurture of the human infant, since all my own children were brought up by hand, and for the first six months of their life their staple food was the product of the goat. A marked change was speedily noticed in their aspect when occasionally from necessity cow's milk had to be substituted. Moreover, I know from experience that goat's milk is, in very many cases, more easily assimilated and has a better nutritious value than that of the cow in all low conditions of vital force and debility from chronic wasting diseases."

Immunity of Goats from Tuberculosis.

The most valuable feature, however, of this product of the goat is that the animal is comparatively immune from tuberculosis. It was at one time thought that the goat was absolutely exempt, but experiments have since been made which have proved that goats can be inoculated by cow tubercles, or can be contaminated by being reared on tuberculous cow's milk. Cases, however, in which goats have been found to have actually contracted tuberculosis are extremely rare.

In the kingdom of Saxony, according to a report concerning veterinary affairs for the year 1894, it is stated that out of 1562 goats slaughtered, only 10, or 0.64 per cent, were found to be tuberculous. In Prussia, in 1899, 47,705 goats were killed, of which number only 0.41 were infected either generally or locally. Yet it is reported that, with few exceptions, these goats were kept under conditions eminently favourable to infection, these animals running freely in the cattle-sheds and

eating out of the same troughs with tuberculous cows. I will conclude my reference to medical authorities by quoting a statement made as recently as 1905 by the late Sir William Broadbent, in an address on the "Prevention of Consumption and other forms of Tuberculosis," delivered at the Technical College, Huddersfield, in October 1900: "It is interesting to note that asses and goats do not suffer from tuberculosis, and to bear in mind that the shrewd physicians of past days used to order asses' and goat's milk for persons threatened with consumption."

Milk Yields of Goats.

The quantity of milk yielded by a goat varies greatly not only in breeds but in individuals. The usual quantity in a common specimen is from two to three pints a-day at the flush—that is, at the first kidding—though it generally increases on the second occasion. With Toggenburgs there is frequently at least a pint more than this, but three quarts a-day is by no means uncommon.

The period of lactation similarly varies. Irish goats, some of which are very fair milkers for the first twelve weeks, do not continue in profit more than six or seven months; but goats from a strain the milking qualities of which have been developed by carefully selecting the best milkers and artificially prolonging the duration of lactation, will continue in milk for ten months, and sometimes cannot without difficulty be dried off before parturition recurs. This is particularly the case with Toggenburgs, which will continue in milk for two years if not allowed to breed in the following season.

As a good illustration of what can be done by milch-goats of this breed, I append a table showing the yield of milk from a herd of five Toggenburgs which belonged to Mr C. A. Gates of Guildford, who kept careful records of their performances in this way:—

YIELD OF MILK FROM A HERD OF FIVE TOGGENBURG GOATS.

Date of Kidding 1898.	Due to Kid 1899.	Now producing on 7 February 1899.		Quantity of Milk given since Kidding 1898.	Largest quantity given on any one day.		Daily Average.	Remarks.	
		lb.	oz.	lb.	oz.	lb.	oz.		
27 Mar.	16 Feb.	Dried off Dec. 10		1664	4½	8	11½	6 7·19	Pure Toggenburg
7 Feb.	9 Feb.	1	11½	1592	13½	7	0	4 5·83	do. do.
1 Mar.	11 May	3	3½	1382	2	6	3½	4 0·28	do. do.
5 Apl.	9 Feb.	Dried off Dec. 15		1267	3½	7	5	4 15·8	Three-quarter do.
19 Feb.	9 Feb.	Dried off Dec. 10		1234	7	6	12½	4 3·15	Pure Toggenburg
Total . . .				7140	14½	•	...	(714 gallons)	

A Wonderful Milker.

The most wonderful yield that has ever come under my personal observation was that of a Swiss goat named "Sedgemere Faith," the property of Mr Sam Woodiwiss, of Great Waltham, Essex. Whilst on a visit to the owner of this animal, whose wonderful milking powers had been described to me, I was resolved to test the accuracy of the statements made, for though I had often heard of a goat giving a gallon a-day, I had never actually witnessed it. The goat in question



Fig. 16.—"*Sedgemere Faith*," a wonderful milker of the Alpine breed ; has given over a gallon of milk in a day.

was accordingly milked twice daily, and the milk carefully weighed by myself, when the following figures were obtained :—

		lb.	oz.
September	1 (p.m.)	5	2
"	2 (a.m.)	5	3
"	2 (p.m.)	5	3
"	3 (a.m.)	5	0
"	3 (p.m.)	4	12
"	4 (a.m.)	5	3
"	4 (p.m.)	5	3
"	5 (a.m.)	5	7½

The quantity produced daily was thus on an average 10 lb. 5 oz., or more than a gallon a-day, and this quantity would no

doubt have been exceeded but for the fact that the goat came in season on the third day, and falling off in appetite in consequence, her yield decreased accordingly, as the figures show. In the last twenty-four hours during which she was under examination, the yield was 10 lb. 10½ oz., or exactly a gallon and half a pint. It should be further stated that this goat was not in her full flush at the time, having been in milk five months, and the time of year was towards the close of summer, when the flow in milch stock, whether goats or cows, generally falls off. Fig. 16 shows a picture of this goat with her immense udder.

Analyses of Goat's Milk.

The analysis of the milk of different goats shows considerable variation in the amount of butter-fat, and particularly so in different breeds. Thus the goats of Switzerland, with scarcely an exception, give a milk comparatively poor in this constituent, almost always under 4 per cent, but very rarely less than 3 per cent, which is the legal standard for this constituent in cow's milk. On the other hand, English breeds, and especially the Anglo-Nubian and others having Eastern blood, give a milk very rich in butter-fat. Results of analyses made at the London Dairy Shows by Mr F. J. Lloyd, F.C.S., F.I.C., may be given as illustrations, whilst they also show the amount of milk yielded.

YIELDS OF VARIOUS BREEDS OF GOATS, WITH PERCENTAGE OF FAT AND OTHER SOLIDS.

	1	2	3	4	5	6	7
	Anglo-Nubian.	Anglo-Nubian.	English.	Alpine.	Toggenburg.	Anglo-Nubian Toggenburg.	Anglo-Toggenburg.
Days in milk	10	244	41	189	183	49	190
Average daily yield (in lb.) .	6·80	2·75	7·6	7·35	8·55	2·10	1·1
Percentage of fat	5·88	5·83	3·75	3·64	3·21	5·19	12·19
" of other solids . . .	9·64	9·27	9·13	8·04	8·05	9·03	10·37
Total solids	15·52	15·10	12·88	11·68	11·26	14·22	22·56

The above figures show in some cases remarkable results. Goats Nos. 1 and 4 are exceptional for their yields, the latter giving nearly three-quarters of a gallon after having been in milk 189 days, whilst No. 7 gave milk of a most extraordinary

richness, especially in the butter-fat constituent. It must be stated in this connection that the samples taken were from the whole of the milk and not from selected portions, such as the strippings. The quantity in No. 7 case was naturally small. Two samples of Anglo-Nubian milk are given, the one from a goat fresh kidded and the other from a goat that had been in milk eight months, as it nearly always happens that the milk is richer in proportion to the length of time since parturition.

The following figures give an illustration of the quality of the milk of goats as compared with that of cows, and the samples in this case are taken from 1st, 2nd, and 3rd Prize-winners in one of the milking trials at the Dairy Show in the case of both cows and goats. The figures in respect of the goats, although prize-winners, may be taken as representing a rather low average:—

		GOATS.		SHORTHORN COWS.	
		Butter-fat.		Butter fat.	
		Morning.	Evening.	Morning.	Evening.
1st Prize-winner	. .	4·19	4·35	3·85	3·72
2nd	„ . .	5·75	5·25	3·93	4·51
3rd	„ . .	5·07	5·27	4·29	4·79

Goat's Milk for Domestic Use.

It was for long a popular idea, and it prevails still to some extent, that goat's milk has a peculiar and somewhat unpleasant flavour. This opinion has generally been formed by people travelling abroad, and especially in Switzerland and Italy where goat's milk is in general use. There is no denying that this milk can acquire a distinctly goatly flavour under certain circumstances and conditions, but it is almost entirely due to want of cleanliness. If the milk is drawn into a receptacle which has previously contained it, and has not been properly cleansed afterwards, such a flavour as I have mentioned is almost sure to result. If, on the other hand, the udder and teats are washed and the pail or other vessel used has been properly scalded it is very rarely that any particular flavour can be detected. It is necessary to qualify the assertion to some extent, because, in my experience with hundreds of goats, I have now and then come across a case in which the flavour could not be accounted for in any way, not even by the circumstance of a she-goat having been in recent contact with a male, whose powerful odour would almost at times seem capable of penetrating to the udder. Certain it is that a she-goat milked soon after contact with a male, and without

the udder and teats being absolutely clean, is very liable to produce a milk of a goaty flavour.

In many instances where people have an objection to goat's milk without reason stated, it is due entirely to prejudice and fancy, for when given cow's milk and goat's milk to taste one after the other they cannot distinguish the latter from the former, and often choose the wrong one.

I may state that any one who has been accustomed to goat's milk in coffee, tea, or puddings will never willingly go back to cow's milk, even to that of the Jersey or Guernsey, for, whether analysis shows an exceptional amount of butter-fat in the sample or not, a creamy condition or flavour is always imparted in a most unmistakable manner.

Butter and Cheese from Goat's Milk.

These products are both obtainable from the milk of the goat as they are from that of the cow, but the result is more satisfactory in the case of cheese. As already stated, when the milk is not fresh it develops an acid known, I believe, as hircic acid, which gives the peculiar "goaty" flavour that under certain circumstances is noticeable in the raw milk when decomposition has commenced. Goat's milk may be put through the separator and the bulk of the cream removed, though there is always a certain proportion left in the milk afterwards. When this cream is churned a butter is produced which is perfectly white in appearance, and of a soft consistence approximating more to the character of lard.

Personally, I cannot recommend it. Tastes differ, however, and some people give a decided preference to it over ordinary butter. A lady goat-keeper once sent me a sample of her own production, which she considered exceptionally delicious, and asked my opinion of it. The colour, of course, was white as usual, but it cut soft and looked greasy, and the taste and odour were decidedly unpleasant and "goaty." I had to give a candid opinion of the article, which, however, was the reverse of complimentary, and, in order to gild the pill somewhat, I thought it would sound better in rhyme. I wrote accordingly the following verses:—

Forgive if I too freely utter
Words which I should p'raps only mutter.
But, dear lady, although
A good goat you may know,
You're really no judge of good butter !

I'm sorry your hopes to have marred
By saying things seemingly hard,
But if my daily pat
Were of butter like that
I'd rather have genuine lard !

A French author writing on this subject states that a pound of goat's butter has one-fifth more bulk than the same weight of cow's butter, and therefore goes much farther. He also mentions the Comtesse de la Boullaye as one who makes an income in Brittany by the sale of this article, which she disposes of in large quantities and at double the price of ordinary butter. One cannot help the reflection that Brittany butter at that rate must be a very different article to Normandy butter.

Various cheeses are made in France in a very simple manner with goat's milk, and have a considerable local reputation, some even finding a ready sale in the Paris markets. In the case of one of these—St Marcelin cheese—the process, shortly given, is the following: the curds are separated by the addition of rennet—a teaspoonful to the litre,—and with a flat ladle perforated with holes are put into round tin pots, also perforated, about 4 inches deep and of the same width, and these are placed on a sort of huge soup-plate for draining. This takes about twelve hours, when they are salted with coarse salt, and put back to drain further. Those that have been subjected to this process for twenty-four hours are turned out into long, flat baskets full of straw, and hung on the roof of the larder to dry, away from flies and insects. This cheese may be eaten new or matured. The writer has tasted a sample, and can pronounce it as by no means unpalatable.

A more popular cheese, however, is that of the Mont d'Or, where large herds of goats are kept, entirely stall-fed for the purpose. This product has a large sale in Lyons and to some extent in Paris. Whilst on the subject of goat's cheese I may take this opportunity to contradict a very popular fallacy that Gruyère cheese is made from goat's milk. It is difficult to understand how the idea has arisen, but although there is a Gruyère goat its milk does not in any way enter into the composition of the well-known cheese of that name.

AN IMPROVED ROOF FOR THE COW-HOUSE.

By RICHARD HENDERSON, Author of 'The Modern Homestead.'

NEXT in importance to having either byre or stable comfortable for the animals and easy on the attendants in so far as feeding the animals and keeping the house clean go, is the providing for a due circulation of the atmosphere within the place by maintaining a steady outflow of spent air, to be replaced by a

fresh supply from outside. The fewer impediments in the form of projecting roof-timbers there are in connection with the building the more readily will this circulation go on.

Local peculiarities of weather are brought about by irregularities of the surface of the surrounding country. A range of hills tends to keep one district drier than those adjoining it by precipitating moisture from the air before it gets its length; while in another instance the adjacent hills are the means, at certain seasons, of leading down cold and adverse currents of air to the low ground. Wide tracts either of plain or table-land maintain a uniform climate throughout whatever may be the leading characteristics of each. But our country, which has been periodically twisted and contorted throughout the geological ages, is now so diversified in configuration as to hold within its comparatively small area many sub-phases of our proverbially fickle climate. Much in the same way do the obstructions referred to above come to interfere with the steady circulation of air that is so desirable in any house in which either man or beast is sheltered.

And these obstructions have another objection which is about as bad, if not indeed worse,—they allow dust to accumulate thereon. This is not a very venial offence one would think. Some sorts of dust are no doubt comparatively harmless; but considering the origin of the dust on the roofing timbers of a cow-house it had better not be there. It has been accumulating since the house was erected, contributed to by particles from the drying manure, from the litter, from the skin of the animals, and from their lungs; amongst the lot a goodly seeding, we may be sure, of spores and bacterial organisms themselves of numerous species. So long as this lies undisturbed it may be harmless, but more or less of it is always being wafted about and getting mixed up in the atmosphere of the place.

Milk, as many of us know, has to encounter numerous drawbacks against its purity as it is being drawn from the cow without this in addition. The air teems with representatives of the lactic acid bacillus, the cow-house bacillus as it is sometimes termed, while other sorts are to the fore; the pail, clean to begin with as brought from the dairy scullery, is gradually becoming tainted with these entities, hairs and scurf from the animals fall into it as the milker rubs against its flank, particles fall from the milker's clothes, and dust rises from the litter, and the milker's fingers are never so clean as at the close of milking-time. "Bless me! don't you take cream in your tea?" we rather impertinently inquired of a West-country dairy-farmer recently. "No," replied he, "milking-time is enough for me." If he objected to milk or cream, however, he relished

a strong lacing of his last cup. On the back of these drawbacks to the purity of milk, which under ordinary conditions can hardly be obviated, dust from the rafters seems a very remote affair. All the same it is better absent.

An objectionable Roof.

The couple-roof, so common in Scotland, is a great sinner in interfering with the steady current of air referred to above as being so desirable in the interests of the animals confined in

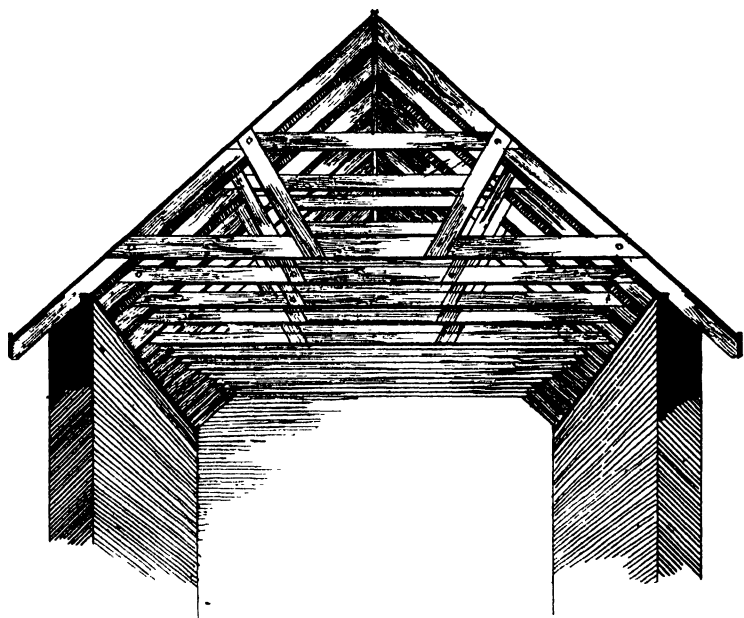


Fig. 17.—*The Couple-Roof.*

the house, and in lodging dust. The specimen represented by fig. 17 will bear us out in this. The trusses or triangles which form the supporting framework of the roof (each consisting of two couples with one or more cross-ties or "balks") are set at 18-inch centres—from the centre of one to the centre of the other measures 18 inches. If, therefore, the couples are 2 inches thick, the space between the trusses is only 16 inches. This should give the uninitiated some idea of how much a roof faulty in this way may be against the sanitary properties of a building of the kind we are dealing with so far as the maintenance of a supply of fresh air and the keeping down of dust are concerned. A roof framework of the kind represented may

be good enough in many instances, but in connection with cow-house or stable that has no ceiling a worse one could hardly be forthcoming.

A Better Roof.

The framework shown in fig. 18 is much better in these respects. It is fairer to the wall too, but that is out of our province at present. This is a type which is far commoner in England than in Scotland. The trusses, or principals as they are sometimes termed, are 9 feet or so apart, and the pieces composing the same are the only timbers that project across or

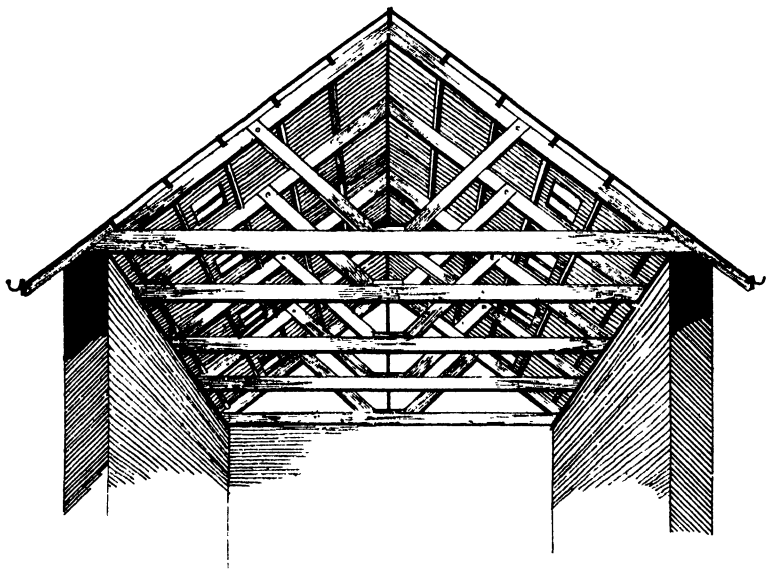


Fig. 18.—*The Principal-Roof.*

occupy room in the central area of the triangular space under the roof. But the "purlins" or bearers which stretch from truss to truss (and they are only 2 to 3 feet apart) all project for their full breadth into the space referred to, thereby interfering with air-currents up the underside of the roofing boards.

The couple-roof is not such an offender in the latter respect, because between couples the boards are clear of obstructions from wall-head to the apex of the triangle just under the ridge. The close ranking of the couple trusses, however, compared with that of the principals, much more than counterbalances that advantage. But either form, it is clear, more or less

checks the regular circulation of air in the roof-space, and also makes steadily for the accumulation of dust to a pernicious as well as unsightly degree.

The Roof Recommended.

The kind of roof (fig. 19) we are seeking to advance, as preferable to any of the types at present in use, has none of the disadvantages above referred to. It cannot interfere very much with air-currents because its surface is smooth and without crack, corner, or crevice, and it is all but void of projecting beams. For the same reason that it does not

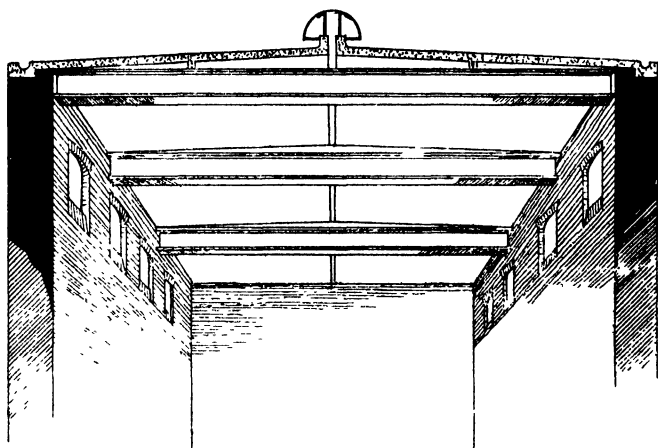


Fig. 19.—*The Roof Suggested.*

interfere with the movement of air it cannot offer much of a lodgment for dust; and cobwebs are hardly likely to become attached thereto in any formidable quantity. And for one thing certain, there can be no such receptacle for dust as the ledge which usually characterises the junction of wall and roof of the ordinary farm-building. All these advantages are, it will be allowed, worth going out of one's way to make sure of.

The suggested Improvements.

Our suggested improvement lies in the direction of turning reinforced concrete, instead of wood and slate or wood and tile, into account. Figs. 20 to 23 explain the sort of roof it is proposed to adopt. At first we were adverse to a flat roof, and tried to work out one of a triangular form after the manner of those

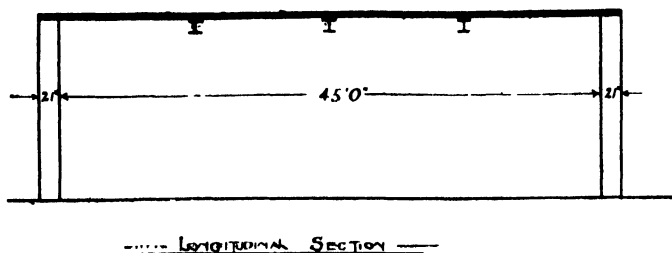


Fig. 20.—Position of Supporting Beams.

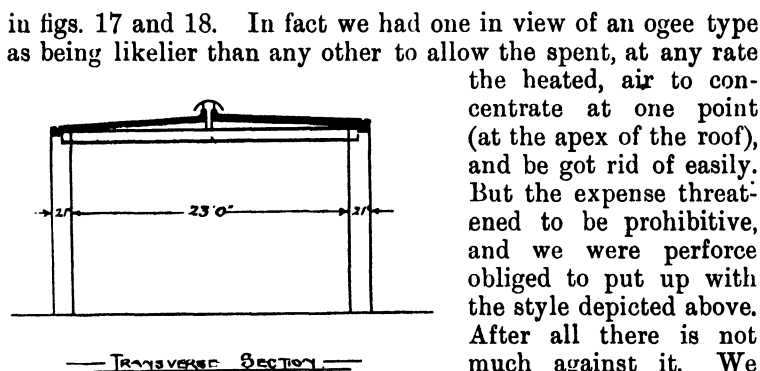


Fig. 21.—One of them in place.

in figs. 17 and 18. In fact we had one in view of an ogee type as being likelier than any other to allow the spent, at any rate the heated, air to concentrate at one point (at the apex of the roof), and be got rid of easily. But the expense threatened to be prohibitive, and we were perforce obliged to put up with the style depicted above. After all there is not much against it. We have only to raise the side walls a foot or two higher to make up for the loss of space that the triangular or ridge roof affords; and as fig. 19 shows, the spent air may get ready enough exit at any time.

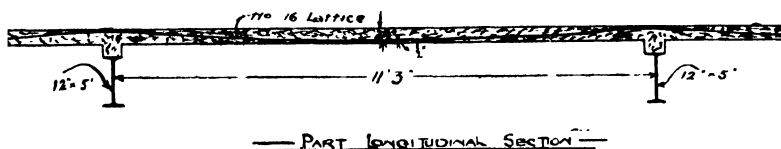


Fig. 22.—Concrete and Beams.

Details of Construction.

Coming to details, the building we have in view at present is a double byre 45 feet by 23 feet inside. This, provided the doors are at the ends, will give room for 15 ordinary-sized Ayrshire cows at each side—30 in all. As fig. 24 shows, it is divided crosswise as follows: 7 feet 3 inches at each side for lairage, 1 foot 9 inches for each of the grips, and a 5-foot centre passage—in all 23 feet across. The walls are of 21-inch

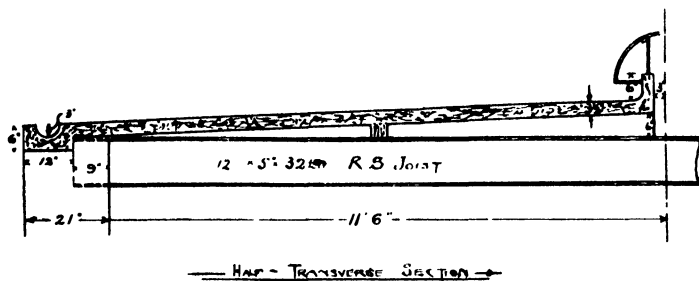


Fig. 23.—Part of Finished Roof.

rubble; they may of course be of brick. Their height would depend on what air-space it was thought expedient to provide for each animal to be accommodated in the building. One with 12-foot side walls would, for instance, permit of about 423 cubic feet for each. The height would therefore depend on local circumstances. The roof is supported on three 12-inch by 5-inch rolled steel joists or girders which stretch from one side of the building to the other. These are the only members that stand clear out from the inner surface of the house. They are, however, more than 11 feet apart, therefore their offence cannot be very great, at least so far as retarding circulation of air within the building goes. We would, for obvious reasons, have them encased in cement plaster.

The roof cover consists of a $3\frac{1}{2}$ -inch sheet of concrete, reinforced by means of a No. 16 lattice, as on figs. 22 and 23. It is in two halves, being divided up the centre line by a slit which is intended to act continuously as an outlet for used-up air. The width of this slit would depend very much on locality. It would not, however, be a very difficult matter to make it adjustable. A hinged flap along the bottom of the opening would serve the purpose. In the majority of cases it might be left without anything of the sort so long as the air-inlets were made easily controllable. Hooded over as shown, this slit would surely prove effective in its way, and yet be able to keep the elements in check.

Eave-gutters, it will be noticed, are worked out in the concrete on the wall-heads. There would be no difficulty in this in the case of walls of stone; and brick walls could be corbelled out at the wall-head to give sufficient breadth for the

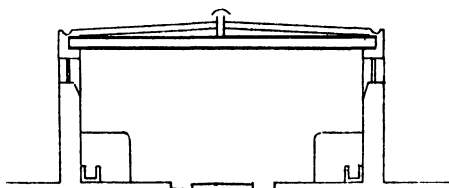


Fig. 24.—Section of Completed Byre.

gutter. Iron conductors or down pipes from the eaves-gutters would still be requisite, but this is not a very important item. They and the hood over the slit on the roof are the only outer fittings that weather would have any appreciable effect upon, and that would necessitate occasional visits from tradesmen; but were the hood galvanised to begin with (and why not the conductors as well?) their visits would be fewer and farther between.

Lighting.

We favour the lighting of farm buildings by way of the roof rather than through the side walls. In the case of our suggested roof, however, the former is not very practicable. It is of course quite possible, but when the iron framework of the roof-lights became decayed it would be an awkward business inserting new windows into the sheet of concrete. Better in every way we think would it be to make use of wall-head

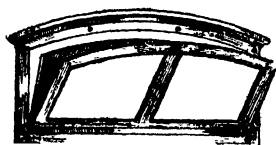


Fig. 25. — *Window.*

side windows such as fig. 25 represents. These would be effective air-inlets as well as means of admitting light to the place. One between each pair of cows would be ample measure. Placed near to the level of the wall-head, these windows would, in the absence of roof-timbers, light up the underside of the roof uniformly and

throw light on the floor and throughout the body of the building generally. The sills would be sharply bevelled down so as not to afford a resting-place for dust. And having the windows in the position we indicate would, to a great extent, prevent the inevitable "tae-fa" or lean-to building being reared against some part of the side walls and shutting it off from light and air.

Ventilation.

Some authorities prefer to have the fresh-air inlets at a lower level than we have suggested, but we question if this point is a very important one. Whether or not, however, it is hardly practicable in a building such as we are dealing with to place them lower. A little above floor-level would, in theory, seem to be the proper place for them, but with animals ranged alongside each wall they would hardly answer there—not at any rate without some arrangement for deflecting incoming currents off the animals, which means extra expense in their installation, together with their being in the way more or less thereafter. Even in buildings where the animals stand clear of

the walls, low-level air-inlets are apt at times to be interfered with through litter and fodder being heaped against the walls. Besides, there they are apt to interfere with cleaning-up operations. And it is much the same as regards the arrangements wherein these low levels are continued by pipes or shafts a few feet up the side wall. These are all very well for the home-farm steading and for the so-called model homesteads. They are not suitable, we consider, for the rent-paying farm. At such the wall-head inlet apparently answers well enough. And the one suggested is window as well as ventilator, and can be regulated with ease to admit air either in large or small quantity as one may wish.

Summary of Advantages.

To sum up, our improved byre has the advantage of being almost without any obstructions overhead to interfere with the circulation of air, and at same time admit of the settlement of dust thereon. The inner surface of the walls merges imperceptibly into that of the roof, the latter smoother than the other, unless the walls are finished off with a thin coat of cement plaster. Should this be done, we have an interior that can be washed down or whitewashed, or be disinfected, with ease by the help of a hand force-pump. The travises and the floor, with the exception of the lairs, being also of concrete, the remainder of the house renders itself as easy to be cleansed (and disinfected when necessary) as the walls and roof. The lairs or cow-stances are paved with brick laid on concrete and grouted with cement, and the troughs are of glazed fire-clay, set on concrete, therefore they may be considered in the same light as concrete itself. No matter can penetrate the floor to pollute the soil, nor can any ooze from the ground into the byre, consequently this inner fabric of the house is bound to be in a thoroughly sanitary condition. There are uninterrupted yet protected outlets to the open atmosphere for the ready egress of spent air as it gathers towards the apex of the roof; and side windows, the opening of which can easily be controlled, afford light as well as the due amount of outside air that may be required to keep that within comparatively fresh.

In the house as finished on these lines there is almost nothing that can go out of order. Outside this applies too (though, to begin with, and perhaps now and again as time went on, it would be well either to tar or coat with cement wash the exterior of the roof). The slater was not there at the beginning, and his services will never be required thereafter. The plumber was hardly in evidence—only to fit up down-pipes or conductors in connection with the concrete eave-gutters, and perhaps

to glaze the windows. Henceforward the local joiner or the handy-man of the farm may be able to attend to these matters. Roofs that can hardly go out of order and do not require the frequent attention of the slater and the plumber, as ordinary ones do, are sure to suit both farmer and factor, and are worth some trouble to search out.

We have taken the cow-house as our text, but the application suits the stable and the other live-stock houses as well—if not, indeed, farm buildings generally.

A YEAR'S WORK IN THE APIARY.

By D. M. MACDONALD, F.E.I.S., Schoolhouse, Morinish, Ballindalloch.

THE calls on the bee-keeper's time while tending his bees are neither heavy nor numerous, because it is only during a few months of the year that they require attention of any kind, and then only occasionally. For something like seven months, indeed, bees are best left severely alone, so that the bee-keeper's year is a short one.

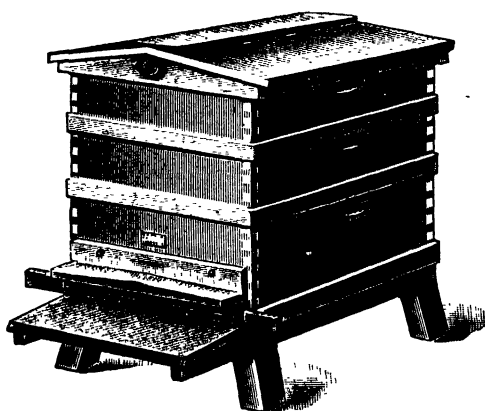


Fig. 26.—A Model Hive.

Early or late in April, under the genial influence of returning spring, the denizens of the hive wake up from the state of semi-hibernation in which they have spent the long winter. The spring flowers hold forth a tempting store of pollen and nectar, which the bees are eager to carry to their hives, so all is now activity and

bustle. The bee-keeper, noting this, begins to frequent the corner of his garden where the hives stand. At first no opening of the hives is permissible, but on a fine mild day a momentary peep may be taken below the coverings to gain assurance that the bees are alive, and that they have a sufficiency of stores to carry them on a few weeks until early

sources yield nectar. In a case where lack of stores is noted, a two-pound cake of candy may be quietly placed above the cluster; or, better, a rich comb of honey may be given from an over-provided colony, first scratching some of the sealed cells that the bees may get the smell of honey. This acts as an excellent stimulant.

The Spring Examination.

Some day in April, generally towards its close, it is advisable to give a thorough overhaul to the interior of every hive. Choose a fine mild day when the bees are flying freely. Have smoker ready and well charged, with veil in order. Remove roof and all top coverings, laying them aside. Gently peel off quilt covering the tops of the frames, giving a few mild puffs of smoke, rather wafting it over the bees than blowing clouds amongst them. Raise each frame, without causing any jar, and examine all carefully. Reject any defective combs, temporarily placing such to one side, or behind the dummy.

In inspecting a frame raise it to the level of the face, examine the side next you, then depress the right hand, raise the left, give the frame a half turn round, when the other side will present itself with the top bar down. When examined, reverse movements, keeping comb as nearly perpendicular as possible all the time, then replace the frame in the hive in its original position. Examine all brood frames thus, all the time taking mental notes of the condition of stores, bees, and combs, in this way diagnosing the condition of the colony as a whole. Note specially all signs of weakness which may arise from a paucity of bees, a failing queen, a scarcity of stores, or at times the presence of disease. This spring examination is one of the many advantages derived from the frame-hive, as the apiarist is able to help the bees by righting what is wrong.

Every hive should have its floor-board scraped scrupulously clean. Rub until the surface is like a new-planed board. Then set up the stand perfectly level, as this has an important bearing on all future comb-building. Gently tilt the floor-board about a quarter of an inch to the front to throw off any water which otherwise might lodge about. Hives showing few bees, and doing little work in brood-rearing, are not worth preserving

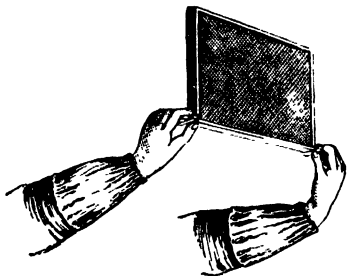


Fig. 27.—*Handling Frames.*

as a rule, and should be joined on to neighbouring hives. It should be remembered that surplus at the end of the season does not depend so much on the number of hives as on the strength of those ready to go into supers at the opening of the honey flow. It may, indeed, be taken as an axiom in bee-keeping that one strong stock is of more value to its owner than three weak ones.

Uniting Bees.

When making this union in spring, bees generally accept the situation without any fighting, if the joining-up is done gently and quietly. It is only necessary to alternate the frames from each hive so that the bees may be pretty well mixed, and then no cause of strife exists, because all are on the same footing. A distinct colony odour exists in every hive, and this has to be overcome before peaceful union can take place. Therefore the following alternative plans may be given. Reduce the frames in both hives in order that the bees may cluster on four in each. Place these in the new hive on each side of a central dummy,

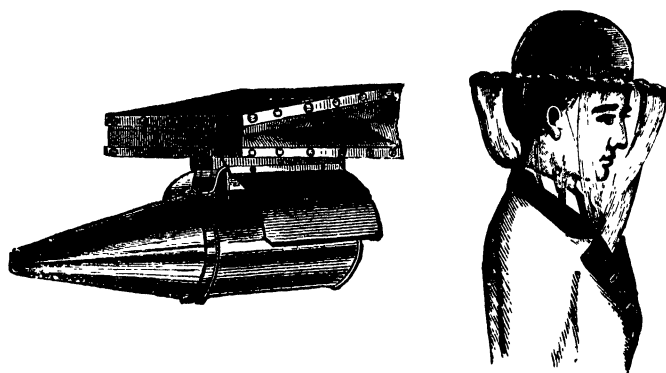


Fig. 28.—*Smoker and Veil.*

with a bee-way at each side or all round. Coat the ends and bottom of this division-board with carbolic acid. In twenty-four hours withdraw this board, and, the odours now being assimilated, the bees will accept the situation and amalgamate peaceably. Should one of the queens be a superior one, cage her for about a day.

In other cases it may be found more convenient to shake off the bees, taking them frame about, on to an enlarged platform placed in front of the new hive. They are then so well mixed up that there is no *casus belli*. To make assurance doubly sure, give the massed bees a good dredging of flour, which will take all the fight out of them. Flour is an excellent pacifier.

Strengthening Colonies.

If the spring examination shows a lack of stores, replenish the store-cupboard with a supply sufficient to keep breeding active until nectar is plentiful outside. The heavy uncapped comb of natural stores acts as an excellent stimulant, and if kept up at intervals it gives bees an idea that nectar is easily available, and thus breeding is accelerated. Some stimulate by giving a slow, steady supply of sugar syrup in a regulated feeder yielding only one or two ounces a-day. When this is decided on, it should be started about six weeks before the full flow sets in, and, once begun, it should be kept up steadily right on to the honey flow. Most bee-keepers now recognise that autumn is the best time to attend to all necessary feeding, because, owing to our variable climate, early spring stimulation often does more harm than good.

Above, it has been advised to withdraw all defective combs, all irregularly built, and those containing too many drone-cells. These can, at the time, be rendered into wax, or can be kept for autumn supering at the heather, and pressed at the close of the season. Their places should be taken up now with new frames fitted with full sheets of foundation wired in. Never renew

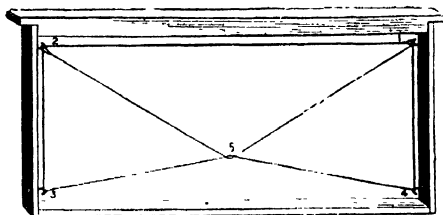


Fig. 29. — *Wiring Frames.*

combs in an established colony with less than full sheets, as, otherwise, you will obtain the whole or greater part of your frame filled with useless drone-cells. Endeavour to renew two or three frames in every hive yearly, in the month of June, so that all old combs may be gradually eliminated from the brood-nest. By doing this systematically you not only add greatly to your force of worker-bees, but you help to ward off disease, and keep the interior works healthy, sweet, and clean. The very great fondness displayed by the queen for these fresh frames plainly testifies that she highly appreciates the advantage of periodic renewal of the hive works. In order that the age of all combs in a hive may be accurately known, it is advisable to mark the lugs of every frame with the date when it was built; but age alone is no criterion for judging of a comb's unworthiness.

Summer Work.

"After April when May follows" bees are increasing daily at a marvellous rate, as may be recognised when it is stated that our best queens lay at the rate of from 2000 to 3000 eggs a-day in the height of the season. Owing to this augmentation of forces the strongest hives are approaching a crisis, so the bee-keeper has to be alert. The genuine work of the apiary does not really begin until mid-June. The spring cleaning, uniting, and renewing of combs were mere interludes. From April on till now, a great part of the attention consisted of occasional outside observations. The veteran bee-keeper trusts extensively to this, reasoning out that if signs of activity and indefatigable labour manifest themselves at every entrance, it is all well with the interior; and so he leaves the prescient little workers to manage their own internal affairs. Too much interference is a great evil, and the fussy meddler is never likely to make a success of the pursuit, but generally loses his own temper and spoils that of his bees.

Many have very erroneous notions on this question of temper. Although 50,000 stinging workers may inhabit a colony, the experienced bee-keeper goes about his labours with as great confidence as if he were handling as many flies. Stings rarely come his way, and when they do they do not trouble him, repeated stings having perhaps brought immunity.

Surplus Honey.

This is the great aim of a bee-keeper's labours. Leaving the bees a sufficiency of stores in the body-box, he sets his wits to work in order that all superfluous nectar may be stored in what are known as supers placed above the brood frames. Little surplus can be gathered in Scotland, unless in the south, until about the middle of June. Then white clover, rich in honey, covers our leas with a rich mantle of white. Early sources, such as willows, plane-trees (*Acer*), the blossom of fruit-trees and runches, have stimulated breeding. Now the bees gather more than they need for this purpose. The bee-keeper should make himself acquainted with the date, varying from year to year, when clover is likely to yield a full flow. Then he must get his supers ready in advance,—racks of sections if he is working for comb-honey, supers of shallow frames if his aim is extracted honey. It is difficult distinctly to define the exact date when these chambers should be placed on any hive, as each successive season varies so much, and while a good deal will depend on both altitude and latitude, each separate hive is generally a law unto itself. It may be taken, however, that

when white clover is fairly plentiful, if weather is settled and warm, and honey coming in, that the interesting period has arrived. Take a glance below lower quilt at the outside top rows of cells, and if you observe these are being whitened and lengthened, there is a need for supers.

Working for Section Honey.

It is safer to place on racks of sections rather in advance of the bees' actual requirements in order to check all intentions of swarming. A few days too early is better than one too late, because, although bees may not immediately take possession, they are kept cool and feel no sense of congestion, which is apt to set up the swarming fever.

In preparing racks of sections it may be advised that whole sheets of foundation pay best. In the first crates placed on give one or two sections, with partly-built comb retained from last season in the centre of each. These are used as "baits" to attract the bees aloft early, and when once accustomed to this new chamber, they quickly see the advantage of storing there, instead of in the brood combs, which are required for the ovipositing of the queen. But the best means of securing an

early start in sections is to have all stocks as strong as possible and packed with bees. These crates or racks should be fitted accurately, with sections folded true and square, while all should be wedged tight and

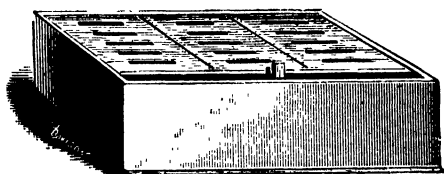


Fig. 30.—Crate or Rack.

firm. In a very good honey flow, a second crate may be inserted below the first when it shows evidence of being about half completed, but, as a rule, it is best to add all after the first *above* the others, to ensure that more shall be completed at the end of the year. An extra crate placed above helps considerably in checking swarming, although the bees do not occupy it.

Section honey sells readier than extracted, and at a better price, therefore many prefer working for sections alone. Wherever the greater part of the surplus take is dependent on the heather, it undoubtedly pays best to work for comb-honey. These sections should be of first grade as far as the wood is concerned; they should be turned out as clean as possible; all should weigh as nearly as possible 16 oz.; and all sold should be well finished and fully sealed. Pack them warmly up when on the hives to avoid any loss of heat. When several racks are

tiered during the height of the season, reduce the number steadily as soon as finished until only one is left, as thus the full force of bees will be concentrated on a smaller area as autumn nights chill, and therefore bees are enabled to do more and better work. If left on too long they get travel-stained and don't look so attractive.

Extracted Honey.

Working for this form of honey has many advantages, especially for men much from home, or for the farmer whose time is taken up with other pursuits during the season of active honey-gathering. The apiarist using the extractor can check or control swarming, because he can, both in the supers and in the brood body, supply the bees with an unlimited amount of room, thus keeping them cool and allowing both bees and queen ample room for work in the space given. He can also leave all chambers

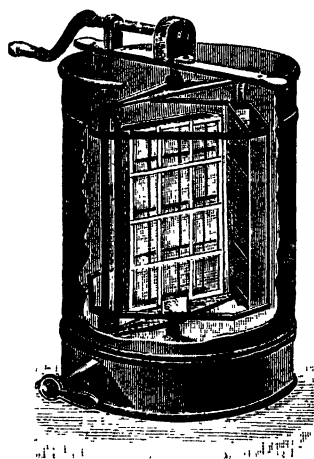


Fig. 31.—Honey Extractor.

on the hives until the close of the season, so that extracting may be done at his own convenience. More honey is obtainable by this method, as combs once constructed are carefully preserved from year to year, thus saving the bees the heavy and arduous labour entailed when working for comb-honey. Honey in this form, if well ripened, as all honey ought to be, will keep fresh for an indefinite time, whereas comb-honey deteriorates before the winter is half over. In this way extracted honey can be kept from year to year until it can be sold at a good price.

The farmer bee-keeper in carrying out this system should proceed as follows: Note all the best colonies, and when they are approaching a crowded condition add a second body-box, allowing the queen the full range of both sets of frames. This will provide a very strong force of bees. A shallow frame-box can soon be added above for storing surplus. During June and the greater part of July, the bees have required no special care, because the added room has acted as well as if a watcher had been giving daily attention. The critical period when swarming is rife in other colonies passes safely for these piled-up hives, and, in course, another shallow frame-body may be required above the first. Later, one of the deep body-boxes

may be shut off from the queen by confining her to the lower one by excluder zinc, thus leaving one deep and two shallow body-boxes for surplus storing, all of which may be left on until it is convenient to do the extracting.

The Extractor.

This is one of the most useful inventions connected with modern bee-keeping, as by its use combs can be emptied after uncapping and again restored to the bees to be refilled. Extractors are made to receive two, four, or more frames, and the best are made reversible, in order that both sides may be cleared of honey without handling. The appliance consists of a large metal cylinder containing fixed cages attached to a central vertical rod, to which is fixed a handle with gearing attached. When uncapping combs, place two knives in water in a tin heated over a small oil-stove. One knife is heating while the other is in use. Shave off the capping in one clear piece, working upward, with the comb held at such an angle as will keep the sheet clear of the knife, and enable it to fall into the capping holder. Take the second hot knife to carry out the same operation on the other side of the comb. Place each successive uncapped comb in the extractor until all the cages are full. Then turn the handle, getting up speed gradually until one side is cleared, after which reverse the motion, continuing until all the honey in the combs is extracted. The honey flows down into a receiver below, through a sieve, after which it can be run through a valve into the receptacles used for storing or for forwarding it to market.

Strong Stocks.

It should be impressed on bee-keepers that, let the system followed be either of the foregoing, strong stocks are an utter necessity if success is expected to crown their efforts. The following means of securing these may be recommended. 1. Make it your aim to have only first-class queens. Remember the chief factor in getting bees is the queen, from whose eggs every single inhabitant of the hive is begot. If she is a poor one, if she is defective, worn out, or deformed, the colony, instead of increasing, will dwindle, or at best drag out a slow and unremunerative existence. A good queen may lay a thousand eggs, while the other lays only one hundred. All queens are best in their first and second seasons. Keep only superior queens. 2. Active slow stimulation has already been given as a means for securing bees. 3. The doubling of body-

box in case of the best queens yields an enormous force for a late flow, especially when one of the body-boxes is withdrawn after swarming is over, and the whole army thrown into one set of frames and supers. 4. With ten or eleven frames, contract the brood area on the approach of the principal flow, confining the bees to eight or nine frames. 5. A liberal use of foundation assists in securing rousing colonies and a large surplus. 6. The best stocks might be still further strengthened early in the season by taking combs of sealed brood, almost ready to hatch, from a medium stock. 7. Further, these already strong stocks might have more bees added to them to make them yet stronger. 8. Bee-keepers should have no hesitation in doubling up two medium colonies. These, separate, may obtain a precarious livelihood, and simply exist at the best, but the combined lots will almost certainly gather not only ample stores but a good share of surplus. 9. Have all the internal works fresh and clean from periodic renewal. 10. Keep disease at bay. If you have a diseased stock, destroy it without the least compunction.

In addition to all these points going to secure powerful colonies, bees require their owners' watchful care to profit by this great strength of numbers. It is not necessary simply to have them strong at some time of the year, but they must attain the crest of the wave at a time which coincides with the chief flow of the season. It is in securing these as two coinciding events that the skill of the expert bee-keeper becomes most manifest.

Checking Swarming.

The apiarist using the extractor can go a very long way towards checking or controlling swarming, because, when a honey glut comes, causing congestion of the brood frames, he can, if the outer frames are broodless and fully sealed, take these out and run them through the extractor, thus giving the queen fair play. No frame with brood should be dealt with; and don't extract unsealed honey because it is unripe. Again, he can, by raising brood temporarily above the excluder zinc, make it certain that bees will go upstairs and stay there to nurse the brood, when they will acquire the habit of consigning their field loads to these surplus chambers. The provision of a space below the brood body for a set of shallow frames, always kept uncompleted, also aids in preventing swarming. Another means of checking the formation of the desire is a supply of ample ventilation, provided by the raising of the front of the hive and tilting the roof during the heat of the day, or even in extreme cases shifting supers slightly round at an angle.

Above all, give ample room both for the queen's ovipositing and for the workers' storing. The instinct once begot seizes the colony at times and generates a perfect mania for swarming.

Swarming.

Swarming is instinctive in bees, and nothing that man can devise will ever wholly suppress or eradicate the instinct. A well-regulated law prevails in the hive interior that, given certain conditions, the little creatures determine to colonise, so they proceed to raise queen cells, numbering it may be a score or more, all arranged to hatch at intervals of several days, to insure that there will be no failure in the line of succession. Bee-keepers try by every means known to them,



Fig. 32.—*Clustered Swarm.*

as recorded above, to hinder this breaking-up of forces into sections by swarming. If, however, a colony persists in swarming, it may be best to accept the swarm. Then hive it in a new hive, but on the old stand, thus giving it at once not only the bees of the swarm, but also all the field bees of the swarmed lot. Strengthen this large force still further as follows: Place the original hive alongside of the old stand, and after a time shift it bodily across to the other side, giving the new colony an important acquisition of the flying field bees. In about a week carry it away to a new site at a distance,

leaving the more mature bees to still further strengthen our swarm, on which, by the way, all surplus chambers were placed at the time of swarming. The enormous number of bees now

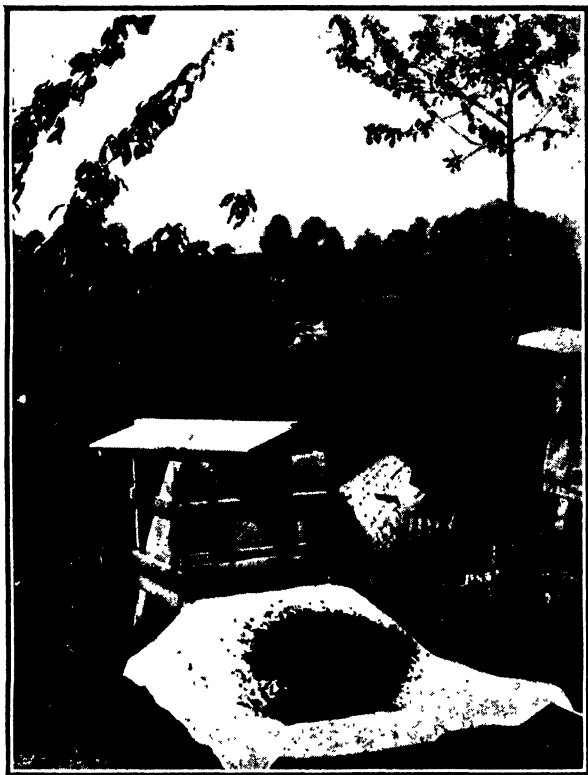


Fig. 33.—*Driving Bees.*

inhabiting the new hive carries on the work as if nothing had happened, while the old hive on its new site should work up into a good stock for next season.

Artificial Swarms.

Many advanced bee-keepers, to avoid the worry of waiting and watching for swarms, take the matter into their own hands. In making an artificial swarm, choose a fine day in late June or early July, when honey is coming in rapidly. Choose two colonies to make three. One will supply the bees. Remove one hive to a new stand, placing the new hive on the old site.

From the second hive take about five frames containing brood, eggs, and honey, filling up the empty space with new frames fitted with foundation or built-out comb. We have now three colonies. With a number of hives on hand, however, the operation can be carried out in a way which will scarcely if at all affect the strength of the stocks dealt with. Take one frame full of sealed and almost hatching brood from each of six or seven hives, filling up the empty space with new frames. Carry these combs with the adhering bees, late in the evening of a fine day, to a new hive. Although the field bees will next day return to their old home, so many young bees will remain, and so many more will have hatched out, that the colony should be established; but if there is any doubt shake two or three frames clear of bees in front of the entrance and they will walk in and help out the fast hatching brood. As an alternative, place the new hive in the middle of a fine day on the stand of a hive which has been shifted to a new site. In both cases supply the new lot next day with a ripe queen cell, a virgin queen, or a fertile mother, caging either queen for a full day.

What is known as "shook" swarming can take the place of the foregoing. A few days before a colony is likely to swarm naturally, remove the old hive with its supers to one side, and place a new hive with frames fitted with starters on the old stand. Improvise a platform to enlarge flight-board and shake or brush off fully three-fourths of the bees in front of the entrance. Transfer supers and leave the rest to the bees. This plan saves a lot of watching for swarms, which is such a bugbear to many.

Nuclei.

Reverting to the swarmed stock dealt with above, if increase is desired, instead of throwing the bees into the swarm, the body-box may immediately be carried to a new site, left there for ten days, and then broken up into three or four nuclei, each containing two or three frames packed with brood and fast-issuing young bees to populate each small lot. The object of waiting for about ten days is to secure that every worker cell should be sealed, and therefore that there would be no danger of chilling brood when nuclei are formed. See to it that each lot possesses one or two queen cells, with a virgin all but ready to hatch out. Feed if there is a dearth, and wrap up snug and warm.

A second plan is to take bees from anywhere that they can be spared. Place the new hive on a well-marked site in any odd corner, and plug the entrance with moss or dried grass or leaves, fixing this in pretty firmly. The entrance may be left closed until the shrinkage of the packing allows the inmates to

make their way out. The bees, owing to the confinement and the worry in making their exit, note their location, with the result that very few desert their new home, but remain with their brood and young queen.

When combs of brood and bees are carried from one part of the home garden to another the whole of the workers who have been out foraging in the fields, when coming home with their loads, make for the old site instead of the new nucleus hive, thus weakening the already small lot, bringing about chilled brood, and frequently disaster. If, however, these frames with bees are carried about two miles to an out-apiary, or any spot obtainable, every bee stays there, and the venture is a full success. Queens can also be pure-mated in such a retired situation if selected drones are carried to the same spot.

Queens.

As so very much depends on the queen heading a stock, it is necessary to keep good queens only if possible, and so many colonies should be re-queened each season. A plan for securing a few young fertile mothers has been given above, but if more are required queen cells can be cut out at swarming time and inserted in small boxes, with a comb containing honey and brood, running in about a hundred bees. These "baby nuclei" do well only in very fine warm weather, but with this requirement fulfilled they yield fine fertile queens. Cells may also be obtained from a colony which is superseding its queen, and the product is generally very fine mothers; because from start to finish the larvæ have been most lavishly fed. If a hive is made temporarily queenless, cells are quickly started, and if these are cut out and given to some of the nuclei from which fertile queens have been taken, they are soon fertilised. Queen rearers have special frames containing artificially constructed cells on a wooden base, and they transfer very young larvæ, one or two days old, into these, after placing some "royal jelly" as food for the young. A score or two of these cells may be given to a queenless hive, and, on hatching out, they may be preserved for some time in queen protectors, before being transferred later each to a nucleus of its own.

Introducing Queens.

Many plans have been invented for the safe introduction of alien queens to a colony where it is deemed advisable to supersede an old or failing queen, but two of these only need be given, both of them amongst the simplest and safest practised. In "Direct Introduction" the essentials are—Depose the old

queen one day, and, late in the evening of the following, lift up the corner of the quilt and let the new queen run in, after driving the bees back by one or two gentle puffs of smoke. Before introducing, however, keep the queen *by herself* in a small box or cage in a warm place for half an hour.

Following the candy-cage plan, in the evening go to the hive and puff in some smoke, lay the cage, wire side down, over the top of two central frames, taking care that the opening is directly above the space between the frames. Let the bees eat away the candy, and thus liberate the queen, which they should do in about twenty-four or more hours. As the queen during her confinement is gradually assuming the colony odour, she is generally accepted favourably on walking out. Don't disturb the colony for forty-eight hours. Failure to introduce queens successfully takes place generally from the fact that some queen remains in the hive, or from undue disturbance when and after introducing. In searching for the queen in order to depose her, never use so much smoke as will set the bees "on the run," and don't jar the hive.

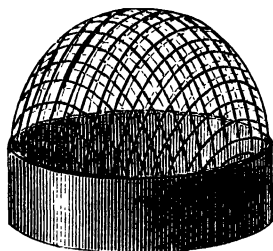


Fig. 34.—Queen Cage.

Dealing with Surplus Honey.

Under modern methods the barbarous system of sulphuring bees has fallen into disuse. The apiarist now acts in such a way that he not only spares bee life, but leaves the bees an ample store of food for winter consumption, while he only appropriates what they consign to the surplus chambers. This he does so gently that the bees scarcely realise that they are being deprived of any part of their honey. By the use of "Clearers" all this surplus honey is taken off the hives without handling a single bee. Even if no clearer is on hand, crates may be left on the hive, above coverings, during the night, and bees will clear out before morning through the cone, which should be in the front of every hive, taking the place of the regular ventilator. Or they can be allowed a free passage between the outer and inner case, when they will quietly join their comrades in the brood nest. Some practise shaking or brushing the bees off the shallow frames or sections, but this causes more of an upset, while it may lead to a loss of bee life by chilling if the evening is cool, and it almost inevitably rouses the bees to sting owing to the undue disturbance.

When taken into the honey-house all shallow frames should

be dealt with as advised when dealing with extracting. All sections should be scraped and made as clean as possible, all propolis and crumbs of wax being cleared off. Handle comb-honey with very clean hands, in order to have the sections both in wood and comb perfectly sweet and clean. Grade all sections into three classes. The best should be prepared for marketing; the second class can be used at home; and the third class, consisting of all not filled or finished, can be kept for baits for next season, after the combs have been drained dry by the bees.

When packing honey for the market, both sections and bottles should be got up neatly and tastefully. Cheap foreign honey, when the contents bear no comparison with the home product, is got up most attractively, and often sells on that account. Pack all sections in fine, transparent waxed paper. Six of these are then parcelled in brown paper, tying them lengthways with twine so firmly that they form a solid brick. Grocers' empties, the size depending on the extent of the order, do very well for packing, as they are cheap and non-returnable. Place two or three inches of hay or straw in the bottom to make a nice soft cushion for the first layer of sections to rest on, and the same for subsequent tiers. Press wads of the same, wrapped in old newspapers, round ends and sides, until everything is perfectly solid. Packed in this way they should reach their journey's end as fresh as when they left home. When marked "Agricultural Produce Rate" they travel at owner's risk at half parcel's rate.

Driven Bees.

In many parts of the country condemned bees can be had from cottagers for the mere trouble of driving them, and one in this way can add to his numbers at a cheap rate. The operation, properly gone about, is a simple one. Choose a fairly good afternoon, neither too warm nor too cold. Give the skep to be operated on a few puffs of smoke at the entrance, slip a carbolised cloth below, and then turn the hive upside down, resting it on a chair or stand. Place an empty hive above, fixing it into position with driving irons. Turn your back to the strongest light, and raise the part of the under skep farthest from you so that the connecting link, where the combs meet, may be the highest point. Begin beating or drumming the sides of the lower hive with the palms of the hands or with two small sticks. Withdraw the carbolised cloth, and, as you go on drumming, the bees will soon scamper up into the empty skep. Two or three lots should be joined together, as it takes five or six pounds of driven bees to make up a strong stock. While it helps matters to give them some built-out combs, it is well to supply them with a certain amount of comb-building, as

then breeding is more likely to be started, which will be a great aid in building up the stock in spring. Feed liberally, a good, thick, well-made syrup. Supply this in a large rapid feeder,



Fig. 35.—*Hiving a Swarm.*

which will enable them to take down half a dozen or more pounds during the night. It is best that this food should be given late in evening to check robbing.

Wintering Bees.

With the close of the white clover harvest, or in favoured places where the lime-trees cease yielding, the honey season is at an end. Where heather grows it may last a month or so longer. As soon as possible after, hives should be prepared for the winter. How to successfully winter bees is a difficult problem with many, but if a few well-known rules are followed, difficulties, except in special cases, should vanish. Thirty pounds or more of good well-ripened honey should be left in the body-box of every hive. This, with a strong force of bees, headed by a young fertile queen, plenty warm, dry packing overhead, and a dry weather-tight hive, solves the problem. The strong colony well provided, it may be confidently predicted will come out in spring healthy and ready for efficient work in the new season. Many who are troubled with "spring dwindling" bring the

affliction on themselves. Too late autumn feeding, too thin food, and the syrup imperfectly made, must yield poor results. Have all feeding done as early in September as possible, so that the bees may have time to rearrange and seal all stores in the hive before cold weather sets in. Indeed, a great deal of the success of next year's results may be secured by this important care timely given in autumn. With this winter packing carefully attended to, a bee-keeper's year's work in the apiary is brought to a close.

BACON CURING ON THE FARM.

By LOUDON M. DOUGLAS, F.R.S.E.

SWINE husbandry has been one of the pursuits of agriculture since the earliest of times, and the records of history show us that the flesh of swine was held in high esteem amongst the ancients, but the cultivation of swine husbandry in these far-off days was somewhat different to what is practised now."

"Every art," says Youatt, "was put into practice to impart the finer and more delicate flavour to the flesh: the poor animals were fed, and crammed, and tortured to death in various ways, many of them too horrible to be described, in order to gratify the epicurism and gluttony of this people."

Pliny informs us that they fed swine on dried figs, and drenched them to repletion with honeyed wine, in order to produce a diseased and monstrous-sized liver. The Porcus Trojans, so called in allusion to the Trojan horses, was a very celebrated dish, and one that eventually became so extravagantly expensive that a sumptuary law was passed respecting it. This dish consisted in a whole hog, with the entrails drawn out, and the inside stuffed with thrushes, larks, beccaficoes, oysters, nightingales, and delicacies of every kind, and the whole bathed in wine and rich gravies. Another great dish was a hog served whole, the one side roasted and the other boiled.

Varro states that the Gauls produced the largest and finest swine's flesh that was brought into Italy; and according to Strabo, in the reign of Augustus they supplied Rome and nearly all Italy with gammons, hog-puddings, hams, and sausages. This nation and the Spaniards appear to have kept immense droves of swine, but scarcely any other kind of live stock; and various authors mention swine as forming a part of the live stock of most Roman farms.

In fact, the hog was held in very high esteem among the early

nations of Europe, and some of the ancients have even paid it divine honours: in the island of Crete it was regarded as sacred. This animal was sacrificed to Ceres at the beginning of the



Fig. 36.—*Opening and cleansing the carcass of a pig on the farm.*

harvest, and to Bacchus at the commencement of the vintage, by the Greeks; probably, it has been suggested, "because this animal is equally hostile to the growing corn and the ripening grape."

In the early history of Great Britain the pig figured very largely in the economy of the farm, and, along with beef,

mutton, and veal, was extensively salted during the autumn months, owing to the fact that winter feeding was so scarce. Fresh meat, therefore, of any kind, was only available during these few autumn months, and for the greater portion of the year the consumption of salt meats was common, as there was no other to be had. It is from a beginning like this, therefore, that we trace the art of bacon curing on the farm.

The pig has always been strong in evidence in Great Britain, and from the earliest times to the present day has been associated with agriculture as an animal which can be easily fed and converted into hams and bacon with comparatively little trouble. Long before the institution of bacon factories, bacon curing on the farm prevailed everywhere, and, while it has fallen into disuse in many parts during recent years, the practice still survives in such counties as Cumberland, Westmoreland, and Yorkshire in England, and in Ayrshire and the adjoining counties in Scotland; and it is of interest to know that, by general consent, there seems to be a desire to revive this ancient industry as one of the regular operations of agriculture. There is little doubt that if the technique of the subject could be taught in our agricultural colleges in the same way as dairying, the practice would again spread all over the country, as the reputation of farm-cured meats is so good that they can always command a much higher price than can be obtained for similar goods produced in factories.

In the North of Ireland quite a large industry is carried on in the slaughter of pigs on the farm, which is a custom that has been carried out since very ancient times, and this is perhaps the only part of the United Kingdom where this particular manner of handling pigs is developed to any great extent. The pigs are slaughtered in farm buildings provided for the purpose, and, when cooled, the carcasses are sent to recognised markets. They are then purchased by bacon and ham curers, whose factories are in the towns, and are converted into hams and various other pig products. The system possesses many disadvantages, as, owing to the imperfect methods of handling and cooling, there is a considerable liability to decomposition in the meat, and the result is that taint is much greater in such produce than in what is obtained where the live animal is handled in a properly equipped factory. It is difficult to alter traditional usage, however, so that the practice of farm slaughter continues, and, in so far as the North of Ireland is concerned, exhibits few signs of decreasing.

There is really no reason why this business should not be followed on the farms, provided always that the equipment for handling the carcasses is of a proper character, and that the surroundings are hygienic. The modern factory obviates

the necessity for this farm slaughter; but there are many districts throughout the United Kingdom where it is more convenient to handle the pigs on the farm than it would be to drive them to a distant and uncertain market.

The great impetus which has been given to the farm-curing of bacon and hams is also due, to a large extent, to the fact that mild cured meats are not always wanted for farm use, and it seems impossible to conduct a modern factory except on the basis of the main products being mild cured.

The development of dairying in a small way on every farm, which has taken place within the last quarter of a century, has set free a quantity of by-products which are of the greatest possible value in the feeding of pigs. Under ordinary circumstances, the pig on the farm is a splendid scavenger, but it also will convert into valuable food such residual products as separated milk and whey which would otherwise have to be destroyed.

The Farmer's Pig.

The majority of pigs are produced on the farm, but if farm-curing is generally adopted it will be possible to utilise a much heavier animal than would be accepted by bacon factories. The average weight of a bacon pig is about 200 lb. live weight. The farmer's pig, however, might with advantage be very much heavier than that, but should not be over-fat. This is, of course, a question of breeding, and the cross-bred animal is generally superior in this respect. The pure-bred pig, more especially when it comes to heavy weights, is often objectionably fat.

Before proceeding to select the pigs intended for slaughter on the farm, it may be well to remember that there are several diseases of swine with which the farmer should make himself familiar, so as to obviate the danger of consuming diseased meat in his own household, or selling it to others. The most serious diseases are tuberculosis and swine fever.

The Diseases of Swine.

Tuberculosis is, unhappily, very well known, and arises in swine from the consumption of tuberculous cow's milk. The dairy herds of the country contain a large percentage of cows which are affected with tuberculosis, and unless the milk derived from such cows is thoroughly pasteurised, it is sure to pass on the disease to pigs. Where tuberculosis is generalised in a pig, the carcass should be destroyed, as in the light of all the knowledge we possess the flesh is likely to prove unwholesome. So also with swine fever—the carcasses should at once

be destroyed, and no attempt should be made to use them for human food.

Conformation of a Bacon Pig.

The feeding of pigs is a matter which requires some little study, and, generally speaking, if the pig-feeder who intends to cure his own bacon wishes to have firm meat, he should avoid the use of oily foods, such as maize, in excess, or brewery or distillery refuse, as all these three commodities will produce soft and oily meats, which it would be difficult to cure. What is wanted is a hard fat when the meat is cool, and this can generally be obtained by the judicious use of separated milk, if such is available, or by the admixture of cereal and vegetable foods, such as may be obtained in the locality. The great matter is to produce a pig which conforms to certain specific characters. A long, square, and deep side is what is wanted for ordinary bacon purposes, but where the intention is to cure hams, a short side will answer the purpose better. In either case the conformation should be such that the live animal presents a square or rectangular appearance, as in that conformation the waste is reduced to a minimum, and the cheaper parts are reduced in quantity.

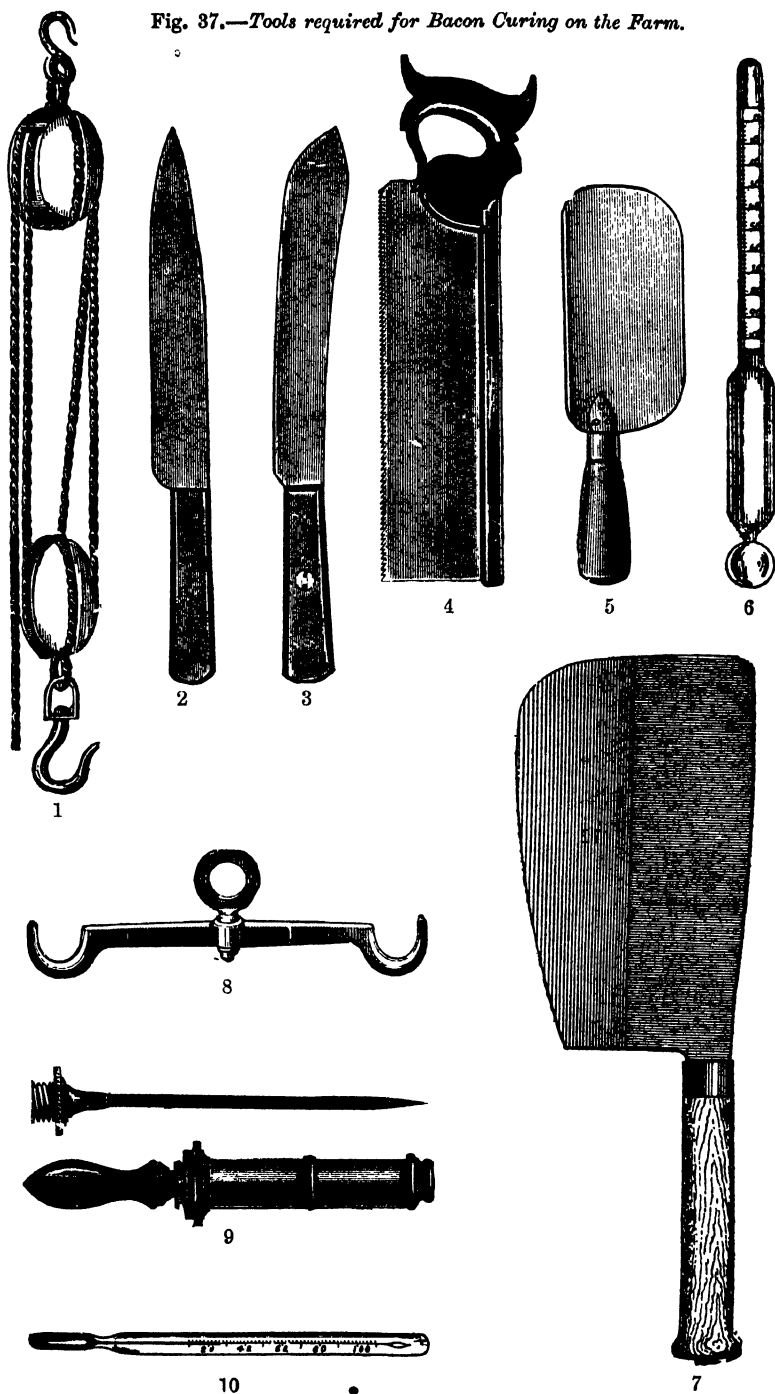
Bacon Curing on the Farm.

As we have seen, the farmer's bacon pig should weigh something over 200 lb., and should it weigh about 224 lb., the dead weight will be 168 lb.; that is to say, the primary or intestinal offal having been removed, will leave the whole carcass, including the head, feet, and flake lard, of the weight indicated. It will be found that the quality of the carcass is much improved if the animal is given nothing but water for about twenty-four hours previous to slaughter, and it should not be excited in any kind of way, otherwise it will be found that many of the smaller blood-vessels will be full of blood, and this is likely to result in the meat refusing to be cured. The time of slaughter on a farm should be chosen on as cold an evening as possible, so that the benefit of the cold night air may be obtained for hardening and cooling the carcass, and the place selected should be as free from odours, dust, and flies as it is possible to find.

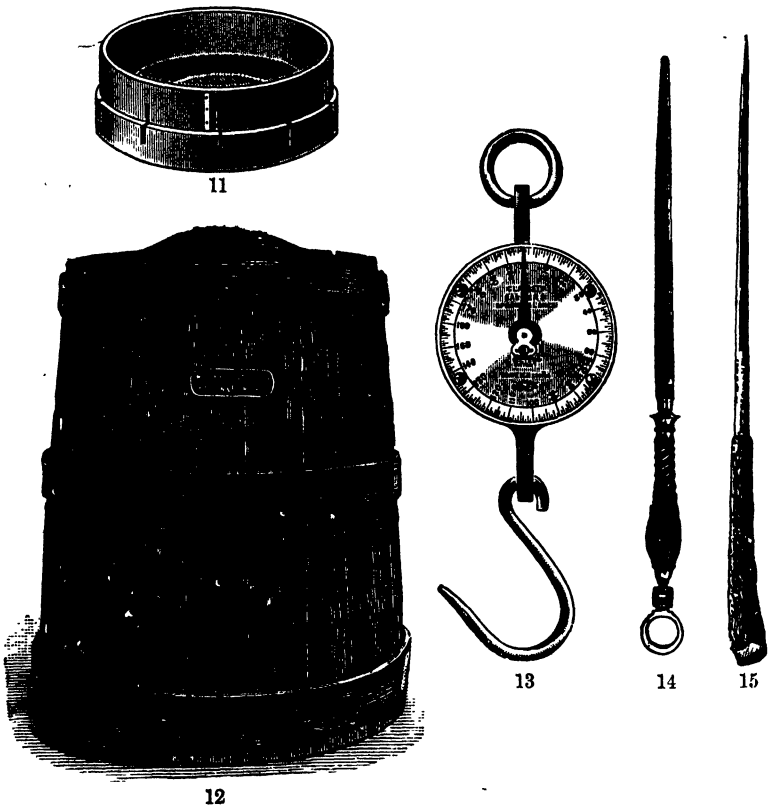
The Equipment.

The tools necessary for farm bacon curing are not many in number, and should consist of the following:—

Fig. 37.—Tools required for Bacon Curing on the Farm.



Tools required for Bacon Curing on the Farm.



DESCRIPTION OF TOOLS.

(1) A common rope pulley block is all that is wanted for hoisting. (2) A sticking knife, which should be sharp and straight, and about 10 inches long in the blade. (3) A straight 10-inch shop knife is the one most commonly used for general purposes. (4) A back saw with 20-inch blade is indispensable. (5) A pig scraper of the flat type answers all purposes. (6) The salinometer is necessary for testing the strength of the pickle, which should be about 100 degrees. (7) A Smithfield cleaver of about 10 inches blade is a necessary tool. (8) Gambrels may be made of wood or galvanised iron. This one is galvanised iron, with a swivel ring, but a simpler one would do. (9) There are many kinds of pickle pump, but on the farm a small pump or syringe will be sufficient. (10) The meat-testing thermometer enables the temperature of the meat to be taken. This is very useful sometimes, as meat of a high temperature (over 50 degrees F.) will not cure with any degree of safety. (11) The mixture of dry antiseptic and saltpetre can be put on the bacon or hams by the hand, but a more certain way of obtaining equal distribution is by means of the hair sieve. (12) A pickling tub can be of any shape so long as it is roomy enough. Those made of oak or other hard wood last a long time. (13) A common spring balance will answer all purposes. One to weigh up to 250 lb. will be best. (14) A steel is a very useful tool. It enables a keen edge to be put on the knives. (15) The ham and bacon trier is very useful. By inserting it into the cured meat and smelling it after it is withdrawn, it will be easy to tell if the meat is tainted or not. After withdrawing the trier, always close the opening made, with the finger.

In addition to these tools it will be necessary to have a boiler so as to heat water, and this can be done in a copper. A scalding-tub, or other vessel for scalding, will also be necessary, and this may be of any convenient design. A very good plan is to have an oval-shaped boiler, built round with brick, and this can be heated with a fire underneath; by means of the pulley-block the carcass can be lowered into the boiler, and by the same means removed on to the scuttling-table.



Fig. 38.—Built-in boiler for scalding pigs, with scuttling-table adjoining.

The scuttling-table is necessary so as to lay the carcass on it after it has been scalded, and, together with a few pails and handy vessels, the equipment will be pretty nearly complete.

The Buildings.

The kind of place which can be used on the farm for handling bacon is, as a rule, very easily obtained. Any outhouse with sides of sparring, and a solid floor, can be used as the slaughtering place, and the scalding-tank can be conveniently situated in this particular position. If, however, such a place is not obtainable, it is quite easy to rig up the apparatus necessary in the open air, and, by means of a little ingenuity, provide a movable scalding-tank out of an old barrel, or some similar

kind of appliance. The carcass may be hung to a ladder, to a branch of a tree, or to a tripod formed of three poles; any of these methods will suffice. The curing-cellar should be located in a cool place, and should be kept spotlessly clean, the atmosphere always being fresh and cool. The floor of the cellar should be continuous if possible, and formed of cement, sloped in one direction so that any pickle oozing from the sides would flow in that direction, and it could be caught in a hold-all situated at a convenient point in the cellar. There should be two or three tanks about three feet square in the corner of the cellar, which should be fitted with a cleansing plug at the bottom, and these tanks will be handy for the curing of heads, feet, houghs, and other by-products. The walls of the cellar should be quite smooth and washed over with cement, and the ceiling should be boarded over and packed in between the joists with sawdust. Such a "cellar" should be fitted with a tight-fitting door, and, if possible, the door should be insulated by being constructed of boarding, placed at either side of runners, and packed in between with sawdust or other insulating material. There should be no window into the cellar, but there should be ventilators at the highest point, which can be opened and shut at will so as to enable the vitiated atmosphere to escape whenever that might be desirable. Such a curing-room could easily be constructed on every farm, and although it has been described as a "cellar," it must be borne in mind that there is no necessity whatever for excavation in the ground so as to construct such a room. The term "cellar" originated in that way, but the cellar excavated in the ground has now passed out of general use, all the modern places being built above ground.

As has been stated, it is necessary to keep the cellar pretty cool, and it will be a matter of judgment on the part of the farmer how to accomplish this.

If the farm should be a large one and it be intended to handle a fair number of pigs for bacon, it might be a consideration whether it would not be desirable to put down a small refrigerating machine so as to cool the cellar to a constant low temperature of about 42° F. This, however, means a considerable outlay, which might, in many cases, be prohibitive. Should a refrigerating machine be available, it would be desirable not only to cool the cellar with this machine, but to cool a small chill-room also, so that the carcasses previous to being cut up for curing could be chilled to about 38° F., and so rendered hard and firm.

In addition to the cellar, there ought to be a small room set aside for the manufacture of sausages and small goods, and the equipment in this place should consist of a sausage-machine, a

sausage-filler, and a cooking pan, with small convenient tables, a few knives, spice tins, and other accessories.

The Handling of the Pig.

It will generally be found desirable to first render the pig insensible by stunning it with a broad mallet or a heavy hammer, a sharp blow inserted between the eyes having this effect. The carcass should then be slung to a pulley-block and fastened to some kind of cross-beam erected in the manner

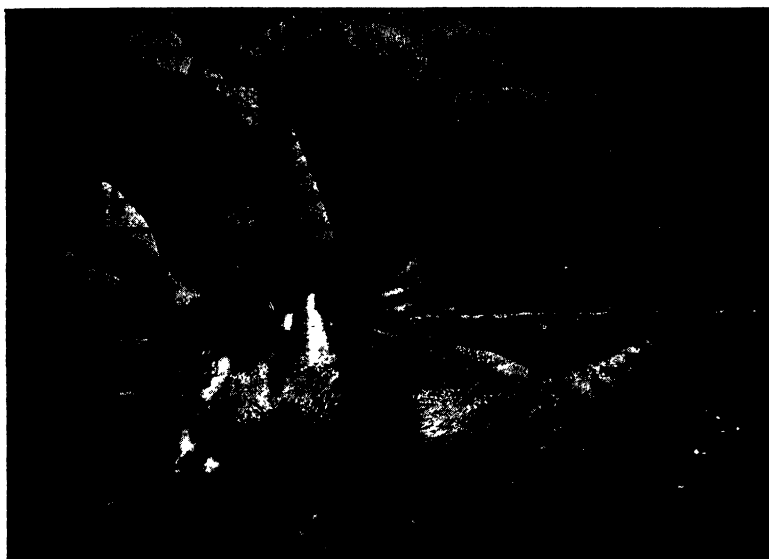


Fig. 39.—*After the pig has been stunned, it may be bled lying on the ground or after being suspended by one of the hind feet.*

already stated, the head hanging downwards and the carcass being suspended by means of one of the hind legs. When in this position a sharp knife is inserted into the throat of the animal, and the blood is let out and may be caught so as to be used for blood-puddings, or it may be allowed to run to waste, or thrown on the manure-heap. In a few minutes the carcass is free from blood, and should be lowered into a scalding-tub or vat in which the temperature of the water is about 180° F. For small pigs the temperature should not exceed 160° F., but the higher temperature would be necessary for the larger animals. The carcass is turned round about in this hot water until the hair comes away easily in the hand. The two hind legs are then split and the sinews exposed, and under these a

gambrel or spreader is inserted, and the carcass is raised again to the horizontal bar, and in this position is scraped all over by means of a flat or blunt knife or recognised pig-scraper, cold water being occasionally thrown over the carcass so as to keep it cool during the process of being scraped. When the hair has



Fig. 40.—*Proceeding to disembowel and dress a scalded carcass.*

been removed an incision is made with the knife between the aitch-bones, and this is continued right down to the apex of the lower jaw. The knife is then inserted so as to sever the aitch-bones, and the bladder and organs of gestation are removed, then the remaining intestines, including the stomach and fat, are all pulled out. The liver and kidneys are taken out and are at once thrown into cold water so as to cleanse

them. The breast-bone is severed by means of a saw, and the skirt is cut right round, as close to the flake lard as possible, and the heart and skirt are cut from the lungs and thrown into cold water to be cleansed. The lungs and wind-pipe are removed through the severed breast-bone and cut off at the base of the tongue, which is left in the head, or it may be cut out there and then so as to be used. Each part of the offal



Fig. 41.—In the South of England especially, where Wiltshire sides are prepared, the carcasses are singed with barley or wheaten straw so as to remove the hair. The illustration shows this being done.

referred to has its particular use, and they should all be cleansed thoroughly and sorted out. The intestines are cleansed, washed, scraped with a blunt knife, and salted, and they are used for sausage-making. The liver, tongue, heart, &c., can be used fresh, or may be chopped up and used in the sausage department for making various delicacies. The kidney, as a rule, is sold whole and the tongue is cured. The stomach, when washed and cleansed, is cooked and sold in that condition. The flake lard is the last of the primary offal to be removed, and after that is done the inside is washed with clean fresh water ;

the lard referred to can at once be rendered into prime quality of lard.

In the foregoing process the carcass is merely scalded and cleansed when in that condition, but where it is intended to make Wiltshire sides of bacon, it will be necessary, after the



Fig. 42. — *The illustration shows a pig which has been stretched on a pole so as to handle it easily while being singed.*

blood has been let out, to singe the carcass, and this is done by spreading barley or wheaten straw on the ground, and also piling it all over the carcass. The straw is then lighted, and the hair on the carcass is in this way singed off, after which it is hoisted on to the cross-bar in the same way as the scalded carcass. Cold water is thrown over it, and it is scraped and

cleansed with a flat knife as before. The other processes are exactly the same as before. When the carcass has been cleansed it should be split in two, and this can be done by making a straight cut just under the skin right down the back from the root of the tail to the neck. The next cut is made deeper on the right side of the back-bone, making that side clear, and without leaving much meat on the bone. The left side of the back-bone is cleaned in the same way, so that the two sides are now left hanging separate. The carcass, with the



Fig. 43.—Cutting the singed pig into sides on a farm where there was no opportunity of hanging up the carcass.

secondary offal, as it is described now, is "dead weight," and it is the custom in many factories to purchase pigs in this way as distinguished from the live weight; there is usually an allowance claimed by the purchaser of 3 per cent for shrinkage.

It will now be necessary to cool the carcass, and this can best be done on the farm by allowing it to hang in a draught over-night, so as to get the benefit of the cool night air. Next day the carcass will be found to be cooled down, and the process of curing may then be begun. The sides are trimmed and the blade-bone pulled out by means of a blade-bone drawer and the help of a blade-bone chisel. The steaks are taken out and are generally used fresh; the neck-bone and aitch-bones are cut loose, and the spare-rib and breast-bones are taken away

along with these. The tops of the ribs are also sawn off and the blade-bone taken out. The large blood-vein in the neck is removed, and when this has been done the trimming of the sides may be said to be complete.

Before proceeding to the curing of the sides it will be necessary to make a curing pickle which is composed of the following materials:—

14 lb. salt.
1½ „ saltpetre.
1½ „ dry antiseptic (boron).
1½ „ cane sugar.
32 „ or 3½ gallons of water.

The total bulk should be five gallons, and it should all be mixed together, boiled, and skimmed until clear. The liquid when cool should give a test about 95° F. on the salinometer, and if it is shown to be weaker than this figure it should be brought up by means of the addition of salt. This pickle should be kept in a clean barrel or other receptacle in the curing-room, and should be drawn into the pickle-pump when wanted.

To cure the meat it is necessary first of all to fill the pocket-hole in the shoulder with a small muslin bag containing salt and about 5 per cent of saltpetre and dry antiseptic added. The sides should then be pumped all over the fleshy parts with the pickle already described, the needle of the pump being well inserted and the pressure maintained at about 40 lb. to the square inch. As soon as this is complete, the sides should be sprinkled all over with an equal mixture of ground saltpetre and dry antiseptic, and should then be laid on the floor of the curing-house. When in this position the belly part should be raised by means of an oak stave, so as to form a saucer with the ribs, and the side should then be sprinkled over with a fairly heavy layer of fine salt. One side is treated the same as the other, the first one being laid in a bed of salt on the floor, the others being laid one by one with the oak stave under the belly part, on the top of one another, until they reach a height of about six sides, or, where room is not available, a greater number may be stacked in this way. Usually on the farm, however, it is not necessary to stack the sides very high. At the end of fourteen days the bacon will be mild cured, but for ordinary farm use it will be too mild, and it will be necessary, therefore, to sprinkle a little more salt on the sides and allow them to remain in the cure for other fourteen days, should it be intended that the bacon should be kept for a long period. The bacon will be somewhat salty, but will be proof against rust, and will keep in that condition for many months. After the bacon is cured, it is taken out of the

cellar, and if there is any salt remaining, it is knocked free from the sides. The bacon is then hung up to drain, or it may be turned in the cellar, rind upwards, so as to get rid of the excess of pickle. This will occupy three or four days, after which the sides may be taken out of the cellar and hung in a cool dark loft so as to dry. It is a mistake to hang them in the kitchen, as the varying temperatures cause putrefaction and rust. If it is intended to have smoked bacon, this can easily be prepared by smouldering some oak sawdust in a



Fig. 44.—*Wiltshire sides cured on the farm.*

confined space in which the bacon is hung. A large barrel is often used successfully for this purpose, but a small smoke-house can easily be constructed of brick, say three or four feet square and about twelve feet high. In this the bacon can be hung pretty high up, and so it is smoked with cool smoke which gives it by far the best flavour.

Hams.

In the curing of hams the process is pretty much the same as in the curing of bacon. The ham is trimmed so as to make a shapely article, and this is done previous to the cure, as also afterwards. The hams are not generally pumped, but are

purged by being thrown into a pickle and allowed to remain there overnight. Next day they are taken out and the blood is squeezed from the blood-veins. The needle of the pump is then inserted along the blood-vein in each ham, and one stroke only is given so as to ensure that some clean pickle has reached the dangerous parts, such as the knuckle-joint. The aperture formed is closed with the finger and the hams are laid on the floor of the curing-house and are covered over with a mixture of saltpetre and dry antiseptic, then salt, in the same way as the bacon. The shank of the ham, however, should



Fig. 45.—One method of cutting up a scalded carcass so as to utilise the parts for hams, middles, and fore-ends.

always be pointing downwards during the process of cure. It is a very good rule to follow in the curing of hams that for a mild cured article, a day should be allowed after the first three days for each pound in weight, and for a ham to be kept any length of time, two days should be allowed per pound after the first three days.

The Wet Cure.

The wet cure of meats is very often carried out on the farm, and simply means that pickle is used throughout, and the bacon and hams are allowed to remain in the pickle all the time until they are cured. The various by-products which

are cured, such as the tongues, feet, head, houghs, &c., are also cured in the pickle, but the time in pickle varies according to the size of the particular product. A very little experience would be sufficient as a guide in this part of the business.



Fig. 46.—*Interior of a small farm factory which has developed from very small beginnings and has been highly successful.*

Sausages and Small Goods.

The manufacture of sausages, black puddings, lard, brawn, and various other commodities of a like character, is now carried out extensively, and as the processes are very simple, there is no reason why they should not form a distinct feature in connection with bacon curing on the farm. It would take too much space, however, to describe these various by-products and their methods of preparation in detail, and we must rest satisfied by merely stating that this part of the business is well worth careful study, as it is highly profitable.

INSECT PESTS IN 1911.

By Dr R. STEWART MACDOUGALL, M.A., Consulting Entomologist
to the Society.

THE LARGE LARCH SAW-FLY (*Nematus Erichsoni*) (Fig. 47).

IN my Reports for the last year or two I have called attention to the destructive work of the caterpillars of this saw-fly on larch. An inspection of larch-plantations in England and Scotland has been made at the instance of the Board of Agriculture,¹ with the result that the Large Larch Saw-fly has been found, not limited to one or two areas where its caterpillars have pressed themselves on the notice of the forester because of their great numbers, but widely distributed over England and Scotland, from the South of England right north to Inverness-shire and Cromarty. Only in two or three zones, however, has the attack been overwhelming. The exact circumstances under which the Large Larch Saw-fly has appeared in destructive numbers in some places and not in others are not known, and therefore places where so far larch has escaped damage should be carefully watched, so that with any sign of appearance of the insect in numbers, immediate annihilative measures may be taken. For recognition purposes I might repeat my description of the caterpillars:² "The full-grown caterpillar measures three-quarters of an inch or a little over in length. It has a round, black, hairy head, with a single simple eye on each side. On the upper surface, all down the back, the colour is greyish-green; the sides are lighter; the under surface is yellowish-green. If a lens be used there will be seen on the abdominal segments transverse rows of minute warts with spines. Along each side is a row of brown spiracles. The legs are twenty in number—viz., three pairs of black thoracic legs and seven pairs of abdominal legs which have the colour of the underside of the body. The head is followed by twelve segments or joints—1, 2, and 3 are thoracic joints, and each bears a pair of legs; 4 to 12 inclusive are abdominal joints; 4 has no legs; 5, 6, 7, 8, 9, and 10 have each a pair of legs; 11 has no legs, and 12—the last joint—carries a pair of legs."

Another saw-fly caterpillar may be found feeding on the larch—on the single leaves of the shoot of the year—viz., the caterpillar of *Nematus laricis*. This caterpillar when full-

¹ Annual Report of the Intelligence Division of Board of Agriculture, part ii., for the year 1910-11.

² A complete account of the Large Larch Saw-fly is given in Leaflet 186 of the Board of Agriculture and Industries.



Fig 47 — *Larch Twigs damaged by N. Erichsoni* (From nature.)
In the top figure a female is seen, dead after egg laying.

grown measures $\frac{3}{8}$ inch. It has a yellow-brown head which is slightly bristly. The body is grass-green, or the colour of the leaves: all over the body are black dots bearing bristles (use a lens). Above the legs, on each side, a delicate light line may be made out. While some of the caterpillars of *N. laricis* may be full-grown in July owing to differences in the time of the appearance of the adult saw-fly, and therefore of the egg-laying, different sizes of caterpillar may be met with at the same moment: last year, for example, *N. laricis* caterpillars were reported to me right on towards the end of August.

In last year's 'Transactions' I mentioned that the females of the Large Larch Saw-fly very greatly outnumbered the males; indeed males are scarce. The result is that a great number of the caterpillars come from unfertilised eggs. Two years ago I reared many caterpillars from virgin eggs which were laid by females isolated and kept in confinement. The cocoons from these I kept over the autumn and winter and the next spring, and towards the end of April (the cocoons had been kept indoors in the laboratory) adults issued from them. All these adults proved to be females.

The number of eggs laid by *N. Erichsoni* is not certain, but dissection of females showed 18 ovarian tubules to each ovary and eggs 180 in number.

The insect parasites of the Large Larch Saw-fly caterpillar have been found in greatly increased numbers in the worst attacked area of north-west England, and much is hoped for from their useful work. One of these parasites is *Mesoleius aulicus*. Dissected females of this species had 20 ovarian tubules to each ovary, and the number of eggs present on dissection was 160.

In the district in England where the Large Larch Saw-fly has done very great damage, Hewitt and Mangan found that the young caterpillars were taken by the great tit, the cole tit, and the blue tit; the chaffinch, rook, jackdaw, and starling destroyed great numbers of the full-grown caterpillars. Some hundreds of nesting-boxes for the birds have been distributed in the district, and last year fifty per cent of these were occupied, —a large percentage in view of the previous comparatively small number of birds. The Small Field Vole (*Microtus agrestis*) makes a hole in the cocoons in winter and eats the sheltering caterpillar.

STROPHOSOMUS CORYLI Fabr. (Fig. 48).

This weevil, found in Scotland from north to south, is sometimes distinctly harmful to young conifers, chiefly pine and spruce. I have record of damage also on Douglas fir, larch, and Japanese larch. Although the records of its work show *S. coryli* to be more harmful on young conifers than on

broad-leaved species, mention is made in the literature of the feeding of the beetles on oak, birch, hazel, and beech. With this species it is the adult which does the damage: the grub lives in the soil, and hitherto there has been no complaint about it. In examples of spoiled plants sent to me the damage was done both to the leaves and to the bark.



Fig. 48.—*Young Pinus sylvestris* damaged by *Strophosomus coryli*. (From nature.)

Young shoots, varying from an inch up to three inches, were in part defoliated, the needles remaining being brown and withered; the pine needles were eaten at the edges sometimes regularly, often irregularly; needles were eaten half-way down;

sometimes the lower half of the needle was eaten away save for a thread of tissue, from which the upper half hung; the surface of the needles was also gnawed. The brown, dead, serrated needles gave the shoots of the year a withered appearance which at once called attention to the infestation. The dying off of the young plants is due also to the gnawing away of pieces of the bark. Indeed on very young plants this gnawing of the shoots by *S. coryli* can be compared to that of *Hylobius abietis*, the Large Pine Weevil, on slightly older plants. *S. coryli* and *H. abietis* were found at work together in one of the cases where specimens were sent to me, and this is not unusual. *Strophosomus* may be feeding on younger plants and *Hylobius* on older plants; or where both enemies are present on the same plants, *Hylobius* will be found feeding on the older parts and *Strophosomus* on the younger. In the cases now reported on, the plants injured by *Strophosomus* were one- and two-year-old plants, save in one instance where five-year-old *Pinus sylvestris* was being defoliated.

S. coryli is a roundish weevil, with the body covered with grey or brown-grey scales; antennæ and legs are brown or red-brown; the proboscis is grooved. Very characteristic of the beetle is the black line or streak at the base of the suture of the wing-covers, due to the absence of scales. Examination of a number of individuals shows variation in size from $\frac{1}{8}$ in. to about $\frac{1}{4}$ in. Adults have been sent to me from Ross-shire early in May as at work on pine foliage, and from Roxburgh in the second week of December. The beetles can have a long life in the adult condition, for examples of the May beetles kept by me in confinement on young pines were still alive in October. I found the beetles pairing in May, and their long life must mean an overlapping of various generations, and the presence at the same moment of the beetle in all its stages from egg to adult.

Strophosomus coryli is unable to fly, hence, on the Continent, a measure practised sometimes against the beetle is the making of trap-trenches. The going round the plants especially early in the season, and shaking the beetles down into dishes containing paraffin or on to spread-sheets, has been tried with success. The beetles fall very readily from shaken plants, and as they feign death on falling, they can easily be collected if sheets be used.

An allied species is *Strophosomus capitatus* De G. (*obesus* Marsh). It can be distinguished from the other by the longer and more marked (use a lens) erect hairs on the wing-covers, and especially by the absence of the black streak at the base of the wing-covers. The damage is done by the adult weevil to buds, shoots, needles, and the leaves of broad-leaved plants.

CECOPHORA SULPHURELLA F. (Fig. 49 and Fig. 50).

In the third week of January 1911 I received pieces of a thick branch of beech infested with the larvæ of this moth. The tree from which the branch had been cut was in a dying condition: the poor condition of the beech was ascribed to infestation by the Beech Scale (*Cryptococcus fagi*). A few days later another specimen reached me, this time of oak. The



Fig. 49.—*Frass of Cecophora sulphurella the bark has been removed.*
(From nature.)

caterpillars were in the outside portion of the wood, which was dead, but this specimen was also cut from a living tree. The branches on which the caterpillars were at work varied in diameter from 2 to 6 inches.

The caterpillars are dirty grey-white in colour, with dark horny head; the body shows a number of dark dots; the legs are sixteen in number, including the anal processes. The

caterpillars were lively, moving actively backwards as well as forwards. Dissection of the bark revealed a large quantity



Fig. 50.—*Chrysalid of Ecophora sulphurella in bark.* (From nature.)

caterpillars of the moth are, I have been told, sometimes very destructive to palings.

of frass and empty pupal-cases and eggshells. Live caterpillars were found on renewed examination in April and also pupæ. Till April the sections of the branches were kept under observation in the laboratory. The first moth issued on April 19 from the oak. On April 22 another issued. The moths were found in copula on April 23. From the piece of beech the first moths came on April 24. One of these lived until May 18.

O. sulphurella is a small and beautiful Tineid Moth, with brown fore-wings covered with yellow scales; bronze and yellow well describes the colour and markings. The hind wings are yellow with dark edges. When resting the moths held their antennæ jutting right out in front of them. The

PEMPHIGUS BURSARIUS (Fig. 51).

Pemphigus is a genus of Aphididæ whose species give rise to galls under cover of which the Aphids live. The gall of *P. bursarius* is found typically on the leaf-stalks of poplar. The foundress punctures the leaf-stalk by her piercing mouth-parts, and the result is a green- or red-coloured gall with fleshy walls. Under cover of the gall the foundress lives, and here the young develop to the mature winged condition. When full development is attained the insects leave the gall by an opening distant from the petiole. The galls open in early autumn.



Fig 51.—Gall of *Pemphigus bursarius* on *Poplar*. (From nature)

WIREWORM.

In the United States there is often considerable loss of Indian Corn "seed" due to wireworm attack. N. T. Fernald reports in the 'Journal of Economic Entomology' treatment that has proved most satisfactory. The seed was first tarred and then placed in a bucket containing fine dust and Paris green, so mixed that the grains of Indian corn, after being shaken up in the bucket, had a greenish colour. The germination of the Indian corn was not interfered with by the process, and the grain so treated was avoided by wireworms observed to be present.

THE COMMON RUSTIC MOTH (*Apamea* (*Hadena*) *didyma* (*oculea*)).

This very common and extremely variable moth is scarcely mentioned in the economic literature. Curtis¹ recorded it as

¹ 'Farm Insects,' by Curtis, p. 225.

injurious to wheat in 1846; Theobald¹ received specimens of the caterpillars in 1905 from Mr A. D. Hall of Rothamsted, where they had been destructive to cocksfoot grass in the experimental plots; Carpenter² has recorded the caterpillars from Ireland as injurious in 1906 and 1907 to barley and oats, the barley being that of experimental plots. To these scanty records it is interesting to add a further example of considerable damage by the caterpillars in 1910 and 1911 at Inveresk near Edinburgh, and at Longniddry, to barley, wheat, and oats. Examples of the caterpillars were sent to me by Mr Thomas Anderson, M.A., B.Sc., of the Edinburgh and East of Scotland College of Agriculture. I determined them as those of the Rosy Rustic Moth, and this was proved by Mr Anderson breeding out the adult moths in the first and second weeks of July 1911. In Mr Anderson's observation of the caterpillars in the laboratory they were found to feed greedily on young plants of maize offered to them, and not to refuse the tender parts of *Bromus inermis*. At Inveresk, where small experimental plots of wheat, barley, and oats of different varieties were being grown, it was noticed that Scots Bere barley was very liable to attack. Two plots of Scots Bere, one winter sown, Nov. 12, 1910, and the other spring sown, Feb. 11, 1911, were badly attacked by the caterpillar during the first week of May. Adjacent plots of Bere—Californian and Smyrna—also spring sown, were scarcely affected.

Description of Moth.

The front wings are brown, varying from light to dark brown, with darker markings; the hind wings are smoky-brown. No moth is more variable in colour and markings.

The caterpillar is green, with the head yellow or light-brown and glossy; down the back there run two parallel brownish or purplish-pink lines separated by green; the spiracles are surrounded by black; there is a brown plate on the last joint. The body is somewhat narrowed at the front and hind ends. The full-grown caterpillar measures about an inch.

Life-history and Habits.

The moths are found flying from the end of June through July to August. Those bred by Mr Anderson issued in the first and second weeks of July. Barrett describes the moths as "hiding in the day-time under copings of walls or in a chink of any kind, but in the vast majority of cases among grass and herbage." The moths fly at night. It is believed that the

¹ Report on Economic Zoology, by Professor Fred. V. Theobald.

² 'Economic Proceedings of the Royal Dublin Society,' August 1908, p. 567, by Professor G. H. Carpenter.

eggs are laid in autumn, and that the caterpillars hatching in the same season pass the winter as caterpillars and become full-grown in May, when they go into the soil for pupation. The Edinburgh specimens pupated in the first week of June. Curtis, on page 226 of 'Farm Insects,' writes: "It is the habit of the caterpillar to crawl up a fresh stem of wheat about four inches from the ground and stop at the apex of the sheath, at which point it is expanded into the blade, where it commences gnawing a hole in the main stem with its head downwards, and in the course of a few hours it thus completely buries itself in the tube of the stem, and having eaten the main stem quite through it usually falls out of the sheath. Where, therefore, these fallen pieces are seen on the ground, they readily lead to a discovery of the caterpillar. It will continue thus within the sheath, secure from observation, gnawing the tender stalk regularly round within, until it has consumed every portion of it quite down to the root, leaving the sheath partly occupied with its faeces. When the caterpillar has destroyed one stem it crawls out to attack a fresh one in a similar manner. Three caterpillars thus in about a fortnight ate upwards of thirty stems."

The caterpillars were watched by Mr Anderson at Inveresk, and in the laboratory, and were found to climb the plant on which they wished to feed. The caterpillar tested the leaf-sheath of each leaf from the base, and finally selecting the sheath of the last fully developed leaf, it pushed its way between the sheath and the developing shoot within, and passed down to the base of the sheath, where it devoured the tender meristem above the node, cutting it through completely. The presence of the caterpillar in the plant is indicated by the widening of the sheath of the last fully developed leaf, by the presence of excrement at the ligule, and by the wilting of the younger protruding leaf, which becomes yellow, and, as it has been eaten through below, comes away very easily. Reporting on the damage, Mr Anderson wrote to me: "In the two plots of Bere and the plot of wheat where the damage was worst, from fifteen per cent to twenty-five per cent of the plants were attacked, but even in these small plots the attacks were local, one larva probably accounting for the damage to several plants at one place. The plants were not completely destroyed, but recovered by tillering; the result of the attack was uneven ripening and unequal ears."

"The wheat plot was sown from the two best ears of a plant reported in July 1910 as the strongest plant in all the plots of that year. The germinative percentage was eighty-three. The plot was in 1911 the worst in tallness, uniformity, and density, the latest to ear, and in all respects the poorest of all the wheat plots."

THE BROWN SPOTTED PINION (*Orthosia litura* L.)

This is another Noctuid moth whose caterpillars were found last summer near Edinburgh in great numbers feeding on chickweed, but also on the leaves of cereals. I know of no previous record of damage to a crop plant. The caterpillars, however, seem to be general feeders, as the following food-plants are named in the literature: meadow-sweet (Newman); bramble, willow, dock (Meyrick); alder, dock, meadow-sweet, willow (Wilson); bramble, rose, and allies (Tutt); bramble, rose, oak, willow, sorrel, dead-nettle, bladder-campion (Barrett).

Moth: The fore-wings are red-brown, with the basal half often grey or pale grey; along the front edge are dark spots, one near the apex of the wing being particularly marked; the hind-wings are smoky, with the margins paler. The moth measures up to $1\frac{1}{2}$ inch in spread of wings. The body resembles the front wings in colour. **Larva:** The caterpillar is round, smooth, and stout. The colour is variable—green, yellow-green, brownish; there are pale dorsal and sub-dorsal stripes with dark edges; the spiracles are white with a black border. The under-surface of the body is pale green; the legs are green, tipped with brown. The colour of the caterpillar varies at the different moults.

Pupa: The pupa is short, squat, and red-brown; at its tip there are two short spines. Surrounding the pupa is a silken cocoon, pupa and cocoon being enclosed in a well-marked earthen covering or cell.

The moths are found in flight from the end of August onwards through the autumn. They fly at night and rest in the daytime among the leaves of trees and herbage. The shiny eggs are laid in the autumn "in cracks and crannies" (Tutt). The winter is passed in the egg stage. The caterpillars hatch out in the next April, and are found during summer. The full-fed caterpillar passes into the soil for pupation.

THE CHRYSANTHEMUM LEAF-MINING FLY (*Phytomyza geniculata* (*horticola*) (Fig. 52).

Leaves mined in the way shown in the Figure are received every year. The Chrysanthemum Leaf-Mining Fly lays its eggs on the epidermis of the leaf. The maggots from the eggs mine between the upper and lower epidermis, making winding galleries in the soft tissue of the leaf, and giving rise here and there to larger blistered patches. When the larvæ are full-grown they pupate in the mined leaf. This is a difficult enemy to fight. Hand-picking and burning infested leaves is a wisely practised measure, especially if this be done before

the disease has made headway. There may be discouragement in this, however, for the large grower, as the same plants, unless the annihilative measure is practised by other growers round about, may soon be infested again. On a small scale, pinching the leaf between finger and thumb to kill the maggot as soon as its presence is noticed may be tried, but in this case care must be taken not to unduly bruise the leaf. The maggot living internally, and protected by the upper and lower



Fig. 52.—Leaf mined by larva of the *Chrysanthemum Fly*. (From nature.)

skin of the leaf, cannot be reached by any spray. Attempts are therefore made to deter the females from their egg-laying by spraying the leaf with some protective spray. For this purpose the following are examples of sprays, used not only against the *Chrysanthemum fly* but against other species with a similar habit: an emulsion of paraffin and soft soap, but care should be taken not to use too strong an emulsion where the leaves are tender; soft soap and quassia, repeated at intervals; tobacco wash; a pint of carbolic acid and half a pound of soft soap to ten gallons of water.

TWO DIPTEROUS ENEMIES OF CEREALS.
THE FRIT-FLY (*Oscinis frit*).

This species is one of the chief cereal pests of Europe. In Britain oats suffers often very severely; barley may also be attacked. The actual damage is done by the larva or maggot.

The fly is less than $\frac{1}{8}$ inch in length, and is bright shining black except the joints of the feet, which are yellow or brown-yellow.

The maggot measures $\frac{1}{8}$ inch when full-grown; it is legless; there are two mouth hooks by which the tissue of the plant is gnawed away; at the blunter hind end two projecting spiracles can be seen (use a lens); on higher magnification branched respiratory processes can be seen on each side at the front end. The puparium, under cover of which the resting-stage is passed, is red-brown, and shows at the hind end the well-marked spiracular processes.

Typically with three generations possible in the year, the flies are seen first, in April and the beginning of May. The females lay their eggs on the leaves, and the maggot on hatching makes its way right into the heart of the young oat-plant. It is the main shoot—i.e., the shoot which came out of the seed—which in the first case is destroyed. Whether or no the plant shall continue to grow depends on the healthiness of the adventitious roots and the success of such tillers as are formed, these tillers being branches that spring from the axils of leaves near the surface of the soil.

In July the second brood of flies may be expected, and the females of this brood lay on pasture and wild grasses or—where suitable plants offer—in the ears of oats and barley. Grain in infested ears is light and shrivelled. The third brood of flies comes by the early autumn, and grasses are used for their egg-laying.

In regard to remedial measures it is not possible to reach the maggots in the heart of the plant, nor the puparia sheltered in the plant. The adults of the third brood are sometimes found in swarms where the puparia have been harvested with the grain, and they should be destroyed. Prevention should rather be aimed at by cultural methods. Early sowing in the spring to get the plants, before the first issue of the flies, over their youngest most dangerous stage, although not a complete preventive, has often proved a wise measure. Where the rotation and the conditions allow, the putting in of the oats in winter is well worth experiment as protection against Frit-fly: even in this case complete immunity cannot be promised, as I had winter oats from England with the Frit-fly larvæ at work on the 19th of December.

Frit-fly has proved a severe enemy during 1909, 1910, and 1911 at the experimental ground of the Edinburgh and East

of Scotland College of Agriculture, near Edinburgh, and so much have the oat plants suffered that it is possible that the oat experiments may have to be removed elsewhere.

During this time a careful record has been kept by my friend Dr W. G. Smith, who is conducting the experiments.

1909.	Sown.	Attack.	Recovery.	Yield.
POTATO (50 outer) *	April 17	June 23: Frit has not damaged this plot much; only a few odd plants.	June 23. All recovering well.	Satisfactory.
POTATO (50 inner)	17	June 25, more plants attacked than Potato (50 outer); about $\frac{1}{2}$.	June 25. All recovering well.	Satisfactory.
POTATO (awned variety, 45 grains)	17	June 25, about $\frac{1}{2}$ plants attacked.	June 25. Not recovering so well as Potato (50 inner).	Moderate.
HAMILTON (50 outer)	15	June 21. Frit has attacked over $\frac{1}{2}$ plants.	June 21. Recovering and growing vigorously.	Satisfactory, Sept. 30. Nov., counted 17 good ears and 120 poorer ears.
HAMILTON (50 inner)	15	June 25. Much less attacked by Frit than Hamilton (50 outer); about $\frac{1}{4}$ plants show signs.	June 25. Almost all growing vigorously.	Satisfactory, Sept. 30.
SANDY (100 grains)	17	June 25. Almost every plant attacked. Worse than Hamilton and Potato. July 24. A few deaf ears, probably the result of Frit.	June 25. Recovering fairly well.	Moderate.
ABUNDANCE (50 outer)	15	June 25. All attacked. July 24. Many deaf ears.	June 25. Recovering better than Abundance (50 inner).	Poor.
ABUNDANCE (50 inner)	15	June 25. All attacked.	June 25. Recovering much worse than Abundance (50 outer).	Poor.
BESELER (50 outer)	15	June 25. All attacked. July 24. Many deaf ears.	...	Poor.
BESELER (50 inner)	15	Do. do.	...	Saved 25 better ears. ...
TARTAR KING (100 grains)	15	June 25. Every plant attacked; worst plot. July 24. Many deaf ears; very few tillers.	...	Poor. Harvested 89 plants, but very few ears at all well developed.

Note.—April 17 was late, but the ground was not ready earlier.

* "Outer" and "inner" grains refer to grains taken from two-flowered spikelets. Outer = larger or lower; inner = smaller or bosom grains.

This record, which is quoted below, is valuable not only because in a number of cases a counted number of oat plants was used, and a record taken of how many were lost owing to Frit and how many were harvested, but also because it gives very useful information as to when Frit-fly attack may be noticed, and what the varieties of oat are, which in Scotland suffer most or have the best power of recovery. Dr Smith's record and observations bring out strongly that the Hamilton and Potato Oat, two favourite oats of Scotland, are the best, in suffering least from Frit-fly.

In the 1909 record Hamilton and Potato were fairly satisfactory as to yield. Sandy was very moderate, Abundance and Beseler were poor. Tartar King was the worst.

In 1909 nine separate grains of *Avena fatua* were sown. Half of the resulting plants were badly spoiled by Frit-fly when examined on June 25. Only one plant—from a black grain—showed no sign of attack.

1910.	Sown.	Attack.	Recovery.	Yield.
POTATO A. (50 outer). Not the same strain as Potato 1909	March 23	June 16, some Frit attack showing on leaves, but not so many plants attacked as Potato A. (inner).	Good.	Sept. 5, harvested 50 excellent plants, i.e., 100 per cent of sow- ing.
POTATO A. (50 inner)	23	June 18, at least half the plants show signs of Frit. The plants are smaller than those of Potato A. (outer).	Good.	Sept. 5, harvested 50 plants, i.e., 100 per cent.
HAMILTON (100 grains) Same race as 1909	29	June 18, scarcely any signs of Frit attack.	Good.	Aug. 30, har- vested 94 excel- lent plants. No evidence that the loss of remainder was due to Frit.
WIDE - AWAKE (100 grains)	April 2	June 16, slight attack of Frit. June 18, about half the plants not attacked.		Sept. 5, har- vested: yield not so good as Potato or Ham- ilton.
BANNER (100 grains)	2	June 16, for past two weeks has shown signs of Frit. June 18, every plant attacked.	Bad.	No harvest, only a few ears from tillers developed after Frit attack.
BESELER	2	June 16, Frit at- tack not quite so bad as Banner. June 18, worst plot of oats for Frit, every plant attacked severely.	Bad.	No harvest, only a few late tiller- ears.

The general result for 1910 was that Hamilton and Potato were better than in 1909, and were not much injured by Frit. Wide-Awake was more damaged by Frit than Hamilton and Potato. Far worse were Banner and Beseler, which were practically destroyed.

1911.

HOME VARIETIES OF OATS.

HAMILTON . . .	Sown April 14. May 23 : a healthy germination ; 99 per cent of grains sown. June 19 : all bad with Frit ; plants from inner grains worst. August 8 : fair recovery, but not so good as same variety in 1909 or 1910. August 30 : a fair crop.
POTATO . . .	Sown April 14. May 23 : 98 per cent germinated ; not so healthy as Hamilton ; at least half the plants have a whitish lower leaf. June 19 : worse with Frit than Hamilton. August 8 : fair recovery and a fair plot. Harvested same number of plants as germinated, so that none were actually destroyed by Frit, but one-third were poor plants.
BESELER . . .	Sown April 12. May 23 : germinated 87 per cent ; plants not healthy ; lower one or two leaves whitish. June 19 : very bad with Frit. August 30 : hardly a good ear ; not more than five. Not harvested.
WHITE CLUSTER OAT	Sown April 12. May 23 : 96 per cent germinated ; all healthy except a few with Frit attack. June 19 : bad with Frit, but not so bad as Beseler. August : a very moderate number of ears. Not harvested.
<i>General Result</i> . .	Hamilton rather better than Potato, but Frit worse this year, 1911, than in 1909 or 1910. White Cluster seriously injured by Frit. Beseler quite ruined.

SVALOF VARIETIES OF OATS AT INVERESK.

These grains were obtained direct from Svalof. They were sown at Inveresk and at Viewbank (these two places are four miles apart). At Inveresk every plot was more or less attacked, but at Viewbank there was no sign of Frit attack, and no notes record it, the yields being normal. The reason for this immunity at Viewbank is not clear ; no explanation can be suggested.

SVÄLOF, 1911.

Sown.	Germi- nation on 9th May.	Plants showing Frit attack.	Appearance on 23rd May.	2nd June.	19th June.	8th August.	Harvest.
VICTORY (White Oat).	Mar. 20	p.c. 33	2 lower leaves (i.e., oldest and next oldest leaves of the plant) with white stripes and patches. 1-3 tillers p. plant.	Frit much advanced.	Has not recovered from Frit yet. Second best plot.	A fair plot.	About 30 fairly well developed ears.
HVITLING (White Oat).	20	74	2 lower leaves with patches, but not so bad as Vic- tory. This is the best coloured of the plots. 2-3 tillers p. plant.	Frit advanced, but younger leaves still healthy. The healthiest plot.	Tallest and greenest plot; has now outgrown Frit. Best plot.	The best plot, but very thin.	65 plants.
LIGOWO II. (White Oat, Abundance type).	22	90	All leaves except the youngest withered and broken. Plants growing stronger than Yellow Probsteier or Golden Rain.	Frit attack worse than the other 3 White Oats, but not so bad as the Yel- low Oats.	A bad plot, only a few plants length- ening to ear.	Only a few plants.	Not harvested.
WHITE PROB- STEIER.	23	79	Tiller shoots greener. 2 lower leaves withered, more discoloured than Hvitling; much like Victory.	Frit much advanced, but still a good proportion of healthy younger leaves.	Third best plot, but a poor one: some plants lengthen- ing.	Only a few plants.	Not harvested.
BEARDLESS PROBSTEIER (Yellow Oat).	23	85	1-3 tillers p. plant. All leaves except youngest are withered. Not much tillering.	Frit very bad; many plants all withered; the best have still 1-2 green leaves.	A bad plot, most plants dead, only half a dozen length- ening to ear.	One or two plants.	Not harvested.
GOLDEN RAIN (Yellow Oat).	23	85	Like Beardless Yellow Probsteier.	Frit tully worse than Beardless Probsteier; most plants all with- ered, the best have only 1 green leaf.	The worst plot; practically all dead.	Hardly any plants.	Not harvested.
BLACK BELL II. (Black Oat).	23	65	2 lower leaves discoloured. Tillering unequal.	...	Beginning to re- cover. Not so good as Hvitling.	Very thin, but something like Victory.	Not harvested.
BLACK MOGUL (Black Oat).	23	81	1-2 lower leaves discol- oured. Plot better green than Black Bell.	...	Much like Black Bell, but scarcely so good.	Fewer plants than Black Bell.	Not harvested.

THE WHEAT-BULB FLY (*Hylemyia coarctata*).

The larvæ of this fly—one of the Family Anthomyidæ, other members of which have a bad record—are sometimes most harmful to young wheat. Their destructive work resembles that of the Frit-fly larvæ on oat, the maggot feeding in the heart of the young plant and causing the death of the shoot. The damage is also great because the larvæ leave one shoot and go to another. The Wheat-bulb Fly larva is about $\frac{1}{3}$ inch long when full grown and extended; it is legless, has a pointed head end with gnawing mouth-hooks and a thicker blunt hind end. Two very characteristic marks for recognition of this larva are the two fan-shaped spiracles, nine divisions to each (Carpenter), one on each side behind the head, and two well-marked two-pronged projections on the edge of the last joint.

The larvæ are observed chiefly in early spring when the wheat plants are dying off; they are full-fed in May, and the adults come in June, July, and August. There is some doubt as to the complete life-history; the ordinary belief is that the flies of the summer brood lay their eggs in grasses, and that the adults developed from these lay on the young winter wheat. On the other hand, some hold that the flies of the summer brood lay their eggs, not on plants, but in the soil, and that these eggs are hardy and persist till the early part—say January or February—of the next year, when they hatch, the larvæ then invading the wheat plants. There is some evidence of this, but wheat plants can be infested earlier than January. I have two English records of dying wheat plants infested with Wheat-bulb Fly maggots, one in November and one in December. Still, examination of records of infestation by this maggot, and of the rotation, tend to show that eggs may be laid in the soil previous to the sowing of the wheat. The following observations have a bearing on this:—

(1) Infestation is worst after bare fallow—*e.g.*, on the same field where 2 acres of wheat followed beans, 4 acres followed Swedish turnips, and 4 acres succeeded a bare fallow, 75 per cent of the young plants after the fallow were attacked, while there was comparatively little damage on the rest.

(2) Attack is worse after potatoes than after turnips. Mr Frank Wilson, of the Edinburgh and East of Scotland College of Agriculture, has sent me a note of such a case with a wheat experiment of 1911. The wheat sown on October 15, 1910, followed potatoes on one part of the field and turnips sown on November 15 on the other. Seventy per cent of the wheat plants following potatoes were attacked, and the yield per acre was only 2 to 3 quarters, while the portion after turnips gave a yield of 5 to 6 quarters, per acre.

(3) Attack is worse after early potatoes than after late.

Observations should be directed to this possibility, Do the flies lay on soil bare of a crop? If so, then the soil should, following the egg-laying, be ploughed in deeply; and further, avoid leaving the soil bare at the time of egg-laying. I am trying to collate the records of infestation by this fly, and I would be grateful if any members of the Society who have experience of Wheat-bulb Fly attack would send me a note of the following particulars: (1) The month in which the disease was noticed; (2) when the attacked wheat was sown; (3) the crop that preceded the attacked wheat; (4) how long the land was bare between the harvesting of this crop and the sowing of the wheat.

THE ROTHAMSTED EXPERIMENTAL STATION, 1843-1911.

By A. D. HALL, M.A., F.R.S., Director of the Station.

IN this Journal for 1895 (5th Series, vol. vii.) the late Sir Henry Gilbert gave an exhaustive account of the results which had been obtained at the Rothamsted Experimental Station during the half century of its then existence, and the conclusions that could be drawn from them. Though Sir Henry Gilbert's paper still holds the ground as the most compendious summary of the investigations that will always be associated with the names of Lawes and Gilbert, and of the mass of data that had been accumulated at Rothamsted, there is now perhaps room for a further account of the work of the Experimental Station during the sixteen years that have since elapsed. It is not only that additional figures have been obtained illustrating the conclusions that had then been reached, but as time goes on new points of view arise and attention is called to questions which were overlooked before. It is the very special value of the Rothamsted experiments, with their continuous history upon a predetermined plan and the complete records which have been preserved, that they can be called upon at once to throw light upon these new questions. In fact, they can be made to furnish a running commentary upon almost the whole of the science of the nutrition of the crop by fertilisers and the soil, and the more our science grows the more we can count upon obtaining enlightenment and assistance from these historic plots. In the following papers it is

my purpose to set out, first of all, some fresh considerations and developments of the original experiments; and, secondly, to deal with the new fields of research which have been opened up since 1895.

A study of the earlier papers will show that Lawes and Gilbert were very greatly preoccupied with the question of the nitrogen supply to the crop and its function in the nutrition of the plant. It had been the subject of their earliest experimental work, it had led to an enduring controversy with Liebig and his supporters, and it had received fresh illumination from the discovery of the bacterial fixation of nitrogen by Hellreigel and Wilfarth. With this dominance of the nitrogen question the results that had been obtained showing the part played by phosphoric acid and potash in the nutrition of the plant had inevitably been pushed a little into the background, and accordingly in the first part of this paper I propose to pay attention to some of the results concerning these fertilisers, which had become or were becoming evident upon the old plots, though Lawes and Gilbert had found no opportunity of calling particular attention to them.

Before proceeding to the subject-matter it may be desirable to continue the history of the Rothamsted Experimental Station which Mr Macdonald gave as a preface to Sir Henry Gilbert's paper. The long collaboration between Lawes and Gilbert came to an end in 1900 with the death of Sir John Lawes in his eighty-sixth year. Since 1843 he had worked continuously with Gilbert at the experiments, and though the latter was responsible both for the conduct of the experimental work and for the actual writing of the papers published in their joint names, not a single communication was published without an exhaustive discussion between the two men on every point involved. Usually several drafts would be prepared, each of which would be annotated and amended by both workers before the manuscript finally went to the printer, and it will always be impossible to separate the shares of the two collaborators, so entirely were they identified both in their way of looking at things and in the final shape their conclusions took. Gilbert survived Lawes' death little more than a year, dying at the close of 1901 in his eighty-fifth year. In October 1902 he was succeeded by the present Director, and the Committee of Management then had to consider the future work of the Station. Despite the munificent endowment of Sir John Lawes the income was only sufficient to carry on the old experimental plots on the original lines and was far below that which the more modern agricultural stations in other countries have found necessary. The scope of agricultural science has been immensely extended: no longer can a single man hope to keep

in touch with all its developments; methods of investigation have been refined and specialised; and whereas in the past an agricultural chemist could take both the nutrition of the plant and the animal and the investigation of the soil as his province, the work must nowadays be divided amongst a number of specialists if any success is to be obtained. Work upon soil, for example, calls not only for the chemist but for a bacteriologist, even for a zoologist, and also for a man skilled in mathematical physics to deal with such problems as the movements of water in the soil. Similarly the nutrition of the plant requires the co-operation of a highly specialised organic chemist with a botanist accustomed to deal with physiological problems, even if we leave out of account the whole field of pathology and disease.

Having in view this increasing complexity of the work, the Committee of the Lawes Agricultural Trust made an appeal to the public for subscriptions, in response to which Mr J. F. Mason, M.P., built and maintained a new wing to the Laboratory for bacteriological work. The Goldsmith's Company gave a donation of £10,000 to provide for soil investigation, and other donors made additions to the permanent endowment or to the working income for the time being. Thanks also to the late Sir Charles Lawes-Wittewronge, who succeeded to the estate of Rothamsted on the death of his father, the Trust was also able to take a long lease of 230 acres of land adjoining the old experimental plots, so that it is now in possession of a self-contained farm of about 300 acres.

The staff now embraces, in addition to the Director and Dr N. H. J. Miller, who was chemist in Sir Henry Gilbert's time, Dr E. J. Russell, in charge of soil investigations; Dr H. B. Hutchinson, Bacteriologist; Dr W. E. Brenchley, Botanist; Mr W. A. Davis, Organic Chemist, and three or four other trained assistants. The creation of the Development Fund, with agricultural research as one of its objects, has also enabled the Board of Agriculture to promise substantial assistance to the Station, so that Rothamsted will in future be adequately equipped to deal with its particular class of problems of soil and plant nutrition.

Continuous Growth of Crops on the same Land.

Perhaps the feature which strikes the ordinary farming visitor to Rothamsted with most surprise is the manner in which certain crops continue to grow year after year on the same land. For example, in 1911 the 68th successive wheat crop was taken off the Broadbalk field, which has carried wheat without a break year by year since 1844. One of the plots has been without any manure for the whole of that period, and though

the yield has naturally fallen it is still in the neighbourhood of 12 bushels per acre, which is about the average production per acre of the world. Where fertilisers are employed the falling off in yield is not observable. For example, in this very year 1911 one of the plots yielded 40 bushels to the acre with a weight of 66·8 lb. per bushel, a weight per bushel which has not been exceeded during the whole course of the experiment. Of course even 40 bushels may be considered an inadequate return for the fertilisers applied, but the point to remark is that any falling off in yield below that which an intensive farmer of wheat may be expected to obtain can be set down to certain mechanical difficulties, and not to any harmful effect upon the soil of preceding crops of the same kind. Where the same crop is grown year after year certain weeds, whose habit of growth fits in with that of the crop, accumulate in the soil and become increasingly troublesome. When one wheat crop succeeds another there is little time for any cleaning operations; the prevalence of one particular weed, Slender Foxtail (*Alopecurus agrestis*), in the Broadbalk field not only necessitates a good deal of hoeing at a time when the crop is injured thereby, but itself tends to choke and smother the plant. Again, the limited amount of cultivation that is possible for wheat is adverse to the crop, for the land never gets the deep and varied working which comes with a rotation.

The experiments with wheat were begun in 1843, but for the four years previously the land had already been cropped without manure, so that it was in a low state of fertility at the outset. Some of the plots have continued without change for the whole period, but, speaking generally, the experiment only took its present shape in 1852, and has now completed six decades without any alteration in treatment. *Table I.* shows the average yield for the first eight years and each 10-year period afterwards from 1844 for five of the more important plots.—*No. 2*, the plot which receives 14 tons per acre of farmyard manure every year; *No. 3*, which receives no manure; *Nos. 6 and 7*, which receive a complete manure, though *7* has double the amount of nitrogen that is supplied to *6*; and *No. 10*, which receives ammonium-salts only.¹ *Fig. 1* shows the same results in graphic form. It is clear that a 10-year period is not sufficient to eliminate the fluctuations in yield due to season; the great depression during the decade 1872-81, when the seasons were almost continuously adverse, being very noticeable in all the curves. Neglecting these minor variations, we see that the unmanured plot *3* shows a continuous though

¹ Throughout the paper ammonium-salts represents a mixture of equal weights of sulphate and muriate of ammonia; complete minerals represents a mixture of superphosphate, sulphate of potash, and sulphates of magnesia and soda.

slow falling off in yield. Even at the outset the land was considerably exhausted as shown by the low average yield of a little over 17 bushels for the first ten years. Evidently the previous rotation without manure had cropped out all the "condition"—*i.e.*, the readily available fertility upon which the immediate crop depends—but when this has been removed and the plant is thrown upon the permanent resources of the

TABLE I.—EXPERIMENTS ON WHEAT, BROADBALK FIELD. AVERAGE PRODUCE OF GRAIN AND STRAW PER ACRE, OVER THE FIRST 8 YEARS (1844-51), AND OVER THE SUCCESSIVE 10-YEAR PERIODS (1852-1911).

Plot.	Abbreviated Description of Manures.	Averages over							
		8 years, 1844- 1851.	10 years, 1852- 1861.	10 years, 1862- 1871.	10 years, 1872- 1881.	10 years, 1882- 1891.	10 years, 1892- 1901.	10 years, 1902- 1911.	60 years, 1852- 1911.
DRESSED GRAIN.									
		bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.
2	Farmyard Manure . . .	28.0	31.2	37.5	28.7	38.2	39.2	35.1	35.5
3	Unmanured . . .	17.2	15.9	14.5	10.4	12.6	12.3	10.9	12.8
6	{ Single Ammonium-salts and minerals }	...	27.2	25.7	19.1	21.5	23.1	21.3	23.5
7	{ Double Ammonium-salts and minerals }	...	34.7	35.9	26.9	35.0	31.8	31.0	32.6
10	{ Double Ammonium-salts alone }	25.1	23.2	25.1	17.3	19.4	18.4	18.4	20.3
STRAW.									
		cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
2	Farmyard Manure . . .	26.6	33.9	31.0	28.0	34.8	38.7	40.9	35.1
3	Unmanured . . .	15.5	15.2	11.5	8.5	8.5	9.1	9.6	10.4
6	{ Single Ammonium-salts and minerals }	...	26.3	22.8	17.7	20.5	20.0	22.5	21.6
7	{ Double Ammonium-salts and minerals }	...	36.4	34.3	28.7	34.1	31.1	35.5	33.3
10	{ Double Ammonium-salts alone }	23.7	24.5	21.9	15.2	15.8	16.2	18.0	18.6

soil the further decline in yield becomes very small. Indeed there is some evidence that the last ten years has been a specially unfavourable period, hence it may take some considerable time longer to reduce the average yield below the 10 bushel limit. Increasing exhaustion of the soil is, however, going on, and, as we shall be able to show later, the slow decline in yield of the unmanured plot follows very closely the exhaustion of nitrogen in the soil.

On the plot receiving farmyard manure, *No. 2*, more of the elements of fertility—nitrogen, phosphoric acid, and potash—are added every year than are removed in the crop. Thus the fertility of the land should tend to increase until the production is limited by some other factor, such as water-supply, and the curve showing the yield indicates the fertility had almost reached its maximum by 1871, though some further

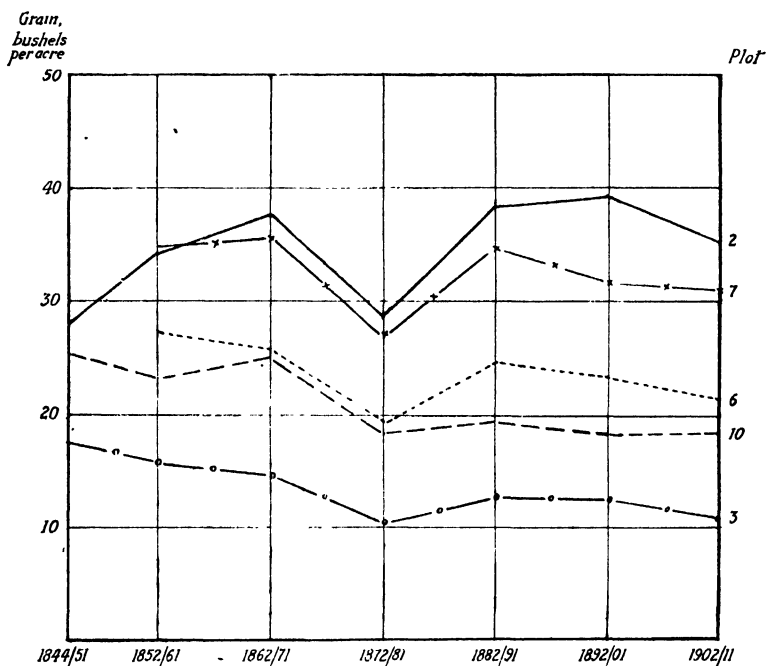


Fig. 53.—*Broadbalk Wheat.* Yield of Grain in successive ten-year periods, 1844-1911.

- Plot 2. Farmyard Manure.
 " 7. Minerals + 86 lb. N.
 " 6. Minerals + 43 lb. N.
 " 10. 86 lb. N. only.
 " 3. Unmanured.

increase continued as late as 1901. The sharp drop in the last ten years may be set down provisionally to seasons, and it may be expected that the crop on this plot will recover again in future decades.

Plot 6, which receives an excess of phosphates and potash, together with 43 lb. of nitrogen as ammonium-salts, has been declining in yield over the whole period, and the analyses of the soil tend to confirm the view that the removals in the crop

are not balanced by the additions in the manure. On *plot 7*, which receives the same minerals but 86 lb. of nitrogen instead of 43, the decline is not so marked; indeed it may be doubted whether any real decline has taken place if the effect of seasons could be smoothed out. *Plot 10*, with ammonium-salts only, shows a result which, though steadily lower, is very parallel to that given by *plot 7*, which differs from it in receiving in addition a supply of mineral manures. This shows how very much the magnitude of the wheat crop is dependent upon the

TABLE II.—EXPERIMENTS ON BARLEY, HOOS FIELD. PRODUCE OF GRAIN AND STRAW PER ACRE OVER SUCCESSIVE 10-YEAR PERIODS FROM 1852-1911 INCLUSIVE.

Plot.	Manuring.	Averages over						
		10 years, 1852- 1861.	10 years, 1862- 1871.	10 years, 1872- 1881.	10 years, 1882- 1891.	10 years, 1892- 1901.	10 years, 1902- 1911.	60 years, 1852- 1911.
DRESSED GRAIN.								
1 O.	{ No Minerals and no Nitrogen } Farmyard Manure .	bush. 22·4	bush. 17·5	bush. 13·7	bush. 12·7	bush. 10·0	bush. 9·3	bush. 14·3
7·2		{ Complete Minerals and Nitrogen }	15·0	51·5	50·2	17·6	44·3	44·3
Mean		47·8	47·7	41·7	39·0	34·9	38·1	41·5
4 A. N. C.								
STRAW.								
1 O.	{ No Minerals and no Nitrogen } Farmyard Manure .	cwt. 13·4	cwt. 10·2	cwt. 6·9	cwt. 6·8	cwt. 6·6	cwt. 6·2	cwt. 8·1
7·2		{ Complete Minerals and Nitrogen }	26·6	29·9	30·1	29·3	29·9	31·7
Mean		31·6	28·6	23·7	22·8	21·5	25·3	25·6
4 A. N. C.								

nitrogen supply, for the increasing exhaustion of potash and phosphoric acid on *plot 10* has only the same effect in reducing the yield compared with that of *plot 7* in the ten years 1902-11 as it had in the ten years 1852-61.

Taking the results as a whole, they would show that the wheat crop does not in any way unfit the land for the growth of another wheat crop provided the fertiliser supply is maintained. If there is any toxic effect brought about by the crop leaving behind in the soil substances which have an injurious

influence upon another crop of the same kind, this effect is very small in the case of wheat, so small as to be negligible. Of course this does not mean that it is advisable as a matter of practical farming to attempt to grow wheat continuously upon the same land, because, as we have said above, there are mechanical difficulties introduced in the way of cleaning the

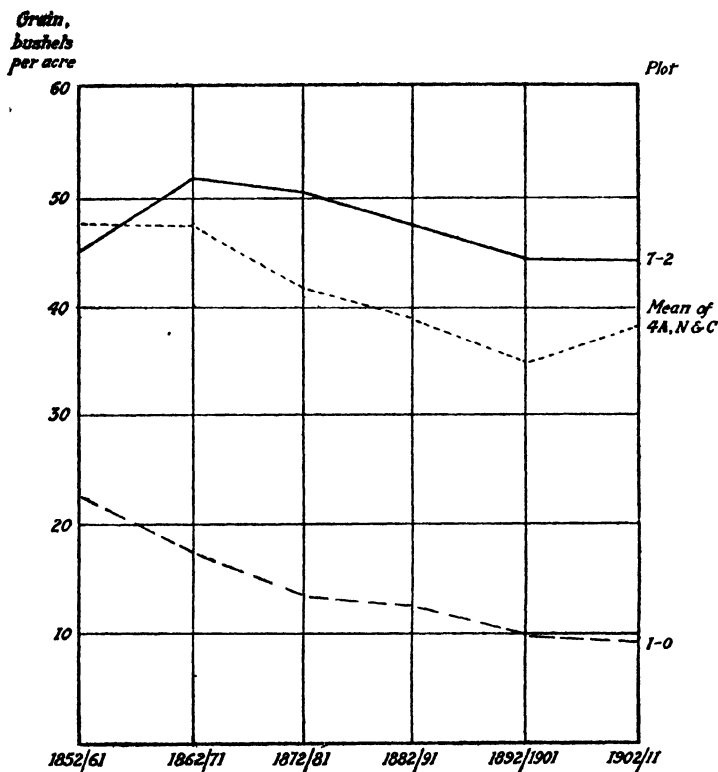


Fig. 54.—Hoos Barley. Yield of Grain in successive ten-year periods, 1852-1911.

Plot 7-2	Farmyard Manure.
" Mean of 4 A. N. and C.	Minerals + 43 lb. N.
" 1-0	Unmanured.

land, and these difficulties are great enough to prevent the wheat on the Broadbalk field from reaching the level of production that we might expect from the fertilisers supplied to some of the plots.

The Barley experiments began in 1852, and *Table II.* and *Figure 54* show the average results obtained for the six complete periods of ten years which have elapsed since then. The

figures and curves show the yield of the continuously unmanured *plot 1/0*, of the plot which receives 14 tons per acre of farmyard manure every year—*7/2*, and the mean of three plots which receive a complete fertiliser containing phosphates and potash in excess and 43 lb. of nitrogen per acre in the form of ammonium-salts, nitrate of soda, or rape-cake. With barley we see definite evidence of a secular decline of yield; not only has the yield from the unmanured plot continuously fallen off until the average is now below 10 bushels per acre, but the yields of the manured plots have equally fallen for the last fifty years, although as regards *7/2* we know there must be great accumulation of fertility, so much more nitrogen, &c., being put on every year than is taken away in the crop.

The difficulty with weeds is perhaps even greater with barley than with wheat, for although the land is bare for a longer time and there is a greater chance of cleaning it by cultivation both in autumn and in spring, these plots have become excessively weedy, especially the unmanured plot where the crop makes so little growth to keep the land shaded. It is difficult, however, to put down the whole of the continued decline in the yield from the plot receiving farmyard manure to such a cause, and in the case of barley, unlike wheat, we must conclude that there is at work some progressive action of the crop upon the soil tending to unfit it for the continuous growth of the same crop. To set down this action to toxins excreted by the crop would in the present state of our knowledge be unjustifiable, but the factor, whatever it may be, is probably associated with the limited root range of barley as compared with wheat. The roots are confined to a comparatively shallow layer of soil in which their excretions, or any products arising from their decay, must accumulate. Even the mechanical conditions of the soil must tend to deteriorate more rapidly with barley than with wheat because of the absence of the tilling action of the deeply penetrating roots which tend to keep the subsoil open. Some light may be thrown on these points during the next two seasons, because it has become so necessary to take drastic steps to clear these plots of perennial weeds that no crop is to be grown during 1912, when the plots will be given a bare fallow, and a subsoil plough will be used to break up any pan which may have been formed below the surface soil that alone has been moved hitherto.

The experiments upon Mangolds began in 1876 upon land which had already been growing various root crops—sugar beet, swede turnips, &c.—since 1843, the manurial treatment applied to the plots being the same as in the previous years, so that the land had already settled down to the conditions

of treatment. *Table III.* and Figure 55 show the average crops over the seven five-year periods that have elapsed since 1876. A first inspection of the curves shows that, speaking generally, the yield of mangolds has been rising on the completely manured plots since the experiments began, although there are very considerable fluctuations in the curves due to the variations of season. Plots *1 O* and *1 N* receive farmyard

TABLE III.—BARNFIELD MANGOLDS. AVERAGE PRODUCE OF ROOTS PER ACRE OVER SUCCESSIVE PERIODS OF 5 YEARS, 1876-1910.

Plot.	Manuring.	Averages over							
		5 years, 1876- 1880.	5 years, ¹ 1881- 1885.	5 years, 1888- 1890.	5 years, 1891- 1895.	5 years, 1896- 1900.	5 years, ² 1901- 1905.	5 years, ³ 1906- 1910.	35 years, ⁴ 1876- 1910.
1 O	Dung only	tons. 14·58	tons. 16·74	tons. 15·73	tons. 22·22	tons. 17·42	tons. 18·70	tons. 23·86	tons. 18·34
1 N	Dung and Nitrate of Soda	20·86	23·45	20·97	29·64	26·87	30·36	35·21	26·49
4 A	{ Complete Minerals and Ammonium-salts }	15·57	16·07	14·83	12·78	14·96	12·89	19·54	15·14
4 N	{ Complete Minerals and Nitrate Soda }	19·40	17·71	18·14	14·23	18·95	16·85	22·19	18·14
4 C	{ Complete Minerals and Rape-cake }	18·91	20·44	19·15	26·13	20·84	23·94	28·71	22·45
4 A C	{ Complete Minerals, Ammonium-salts and Rape-cake }	24·40	26·85	22·36	28·68	24·23	31·48	33·73	27·08
5 A	{ Superphosphate and Ammonium-salts }	9·71	7·99	8·11	5·71	6·61	6·54	6·59	7·35
5 N	{ Superphosphate and Nitrate Soda }	16·46	14·65	15·42	12·94	16·15	13·91	19·34	15·51
5 C	{ Superphosphate and Rape-cake }	12·39	12·48	11·50	11·80	7·98	9·84	12·19	11·14
5 A C	{ Superphosphate, Am- monium - salts and Rape-cake }	12·51	11·24	10·51	10·33	7·61	8·39	9·03	9·98
8 O	Unmanured	3·46	4·26	3·49	4·40	4·04	3·04	4·35	3·86

¹ 4 years only, omitting 1885.

³ 4 years only, omitting 1908.

² 4 years only, omitting 1901.

⁴ 32 years only.

manure at the rate of 14 tons to the acre; *1 N* also receives 86 lb. of nitrogen as nitrate of soda. As the farmyard manure contains more manurial constituents than are removed in the crop, we might expect the fertility of these plots to be increasing, which would explain the steady rise in production. Plots *4 A*, *4 N*, and *4 C* also receive a complete fertiliser containing phosphates and potash in excess together with 86 lb. of nitrogen, as ammonium-salts on *4 A*, as nitrate of soda on *4 N*, and as rape-cake on *4 C*. *Despite the seasonal fluctuations

there can be little doubt but that the production has risen during the period of experiment, especially in the case of 4 C, although from neither the nitrate of soda nor the ammonium-salts can we expect any retention and accumulation of the nitrogen supplied to the benefit of crops in succeeding seasons. Moreover, we have evidence from other experiments at Rothamsted that the nitrogen even of rape-cake that is not utilised by the current crop leaves behind but little

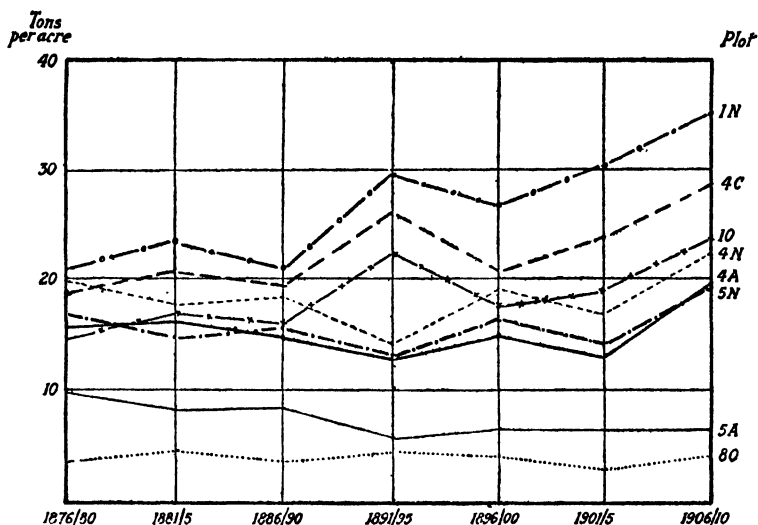


Fig. 55.—Barnfield Mangolds. Yield of Roots in successive five-year periods, 1876-1910.

- Plot 1 N. Farmyard Manure and Nitrate of Soda (86 lb. N.)
- " 4 C. Minerals and Rape-cake (98 lb. N.)
- " 1 O. Farmyard Manure only.
- " 4 N. Minerals and Nitrate of Soda (86 lb. N.)
- " 4 A. Minerals and Ammonium Salts (86 lb. N.)
- " 5 N. Superphosphate and Nitrate of Soda (86 lb. N.)
- " 5 A. Superphosphate and Ammonium Salts (86 lb. N.)
- 8 O. Unmanured.

residue that will be of service later. There is, however, one factor in connection with these plots which does not hold for the wheat and barley, in that the leaves grown on each plot are not removed but are ploughed into the soil. This means a considerable return of organic matter and of nitrogen. For example, these plots in a good season will yield about 4 tons of leaves per acre containing about 0.25 per cent of nitrogen, so that 20 lb. of nitrogen get returned to the soil in comparatively stable forms, and to this cause we may in all probability attribute the steady rise of fertility of the plots receiv-

ing only soluble nitrogen compounds. The indirect influence of organic matter upon the yield in the case of a root crop may be seen in the results for the five-year period 1891-95; this included several very hot and dry seasons when there was a difficulty in obtaining a good plant of mangolds, and it will be seen that the curve of production rises for the dunged plots 1 *N* and 1 *O*, and for the plot receiving organic manure 4 *C*, whereas it falls for the three plots 4 *N*, 4 *A*, and 5 *N*, which receive purely inorganic fertilisers.

The only plot which shows evidence of a steady decline of fertility is plot 5 *A*, which receives only ammonium-salts and superphosphate. There the decline is due to the progressive exhaustion of the soil in available potash. Of all crops the mangold is most dependent upon potash, and on 5 *A* the fertilisers do not contain this constituent, nor do they assist in unlocking the considerable stores of potash contained in the Rothamsted soil. Plot 5 *N* receives the same amount of nitrogen and superphosphate, but the nitrogen in the form of nitrate of soda gives a much larger yield, and the plot, moreover, shows no signs of declining fertility, although like 5 *A* it receives no potash. The soda, however, in the nitrate of soda not only serves as an economiser and enables the mangold to grow with a minimum of potash, but it also attacks the potash compounds locked up in the zeolites in the soil, and brings them into solution so as to become available for the plant. That this action is not quite large enough to supply the whole potash requirements of the mangold crop may be seen from the fact that the yield on plot 4 *N*, which is treated in the same way as 5 *N*, except that it also receives potash, is consistently higher.

Lastly, if we consider plot 8 *O*, which receives no manure at all, we shall see that the production is maintained at a comparatively constant though low level of about 4 tons to the acre. The slow decline of the fertility of the soil which must be taking place in this plot is still masked by the individuality of the seasons and does not show in the production. It is noticeable, however, that the yield of the unmanured plot in comparison with the manured plots is much lower for mangolds than for either wheat or barley.

If we consider the results as a whole, they again show no signs that the growth of the mangold plant in any way unfits the soil for a renewed growth of the same crop: on the unmanured plots the yield is maintained, on the completely manured plots it actually increases as time goes on, and we may, as regards this plant, be pretty sure that growth can be continued over a long period of years upon the same land provided the proper fertilisers are supplied. It should be noted in this connection that of all farm crops grown in Great

Britain, mangolds are perhaps least subject to attacks of disease. The only disease which regularly attacks the mangolds at Rothamsted is a leaf-spot fungus (*Uromyces betæ*), but this only occurs upon the plots which receive an excess of nitrogen and no potash, the incidence of the attack being determined by the composition of the plant due to the manuring, and not by the possibility of infection. The only adverse effect of the continuous growth of mangolds upon this land seems to be a slightly increasing difficulty in getting the seedling plant to grow away vigorously; as soon, however, as it has become established it responds to the fertiliser just as well now as it did in the early days of the experiments.

It will be seen from the above that as regards wheat and mangolds there is no evidence that the crop has any injurious influence upon the soil which would unfit it for the renewed growth of the same crop, and that in the case of barley this factor is small though it is probably real. With other crops, however, there is by no means the same possibility of continuous growth. In the earlier years of the Rothamsted experiments it was found impossible to continue the growth of swede turnips on the same land from year to year, and, again, clover and other leguminous crops are well known to render the land "sick" and to prevent their renewed growth. It is unnecessary to adduce evidence of what is well known to every farmer—that a successful crop of clover can only be grown after an interval of from three to seven years, varying with the soil; but on certain plots at Rothamsted attempts are made to renew the growth of the principal leguminous crops year after year. A plant is obtained, but, as a rule, it dies away more or less completely in the winter, and never yields a commercially successful crop even on the most favourable occasions. Moreover, the effect is specific, as has been seen on various occasions when the nature of the leguminous crops has been changed. For example, vetches grew very badly where vetches had been grown for many years previously, though they succeeded fairly well when they followed red clover. Lucerne likewise, which is less subject than the other leguminous crops to this land sickness, was yet markedly inferior where a previous lucerne crop had been grown. A number of experiments have been made at Rothamsted to ascertain the cause of this so-called clover sickness, but it cannot be said that any definite solution has yet been reached. Undoubtedly the soil is a factor; soils that are rich in lime and supplied with potash, either naturally or by the application of the fertilisers, resist the effects of clover sickness to a much greater degree, and it has been found possible at Rothamsted to grow clover continuously for fifty-eight years on one small plot which originally was part of an

old rich kitchen-garden. Of recent years the growth has been very weak and re-seeding has been constantly required, but in favourable seasons comparatively large yields have been obtained, as, for example, the equivalent of 1·8 tons per acre in 1910. The death of the clover plant on clover-sick land is very largely brought about by the attack of a fungus (*Sclerotinia trifoliorum*) during the winter, which fungus leaves behind large sclerotia in the soil to serve as sources for future infection. It is, however, improbable that this fungus is the determining cause of clover sickness, though it may do the actual killing of the plant. In order to become subject to the attack the plant must have been rendered in some way constitutionally weak, because other plants equally exposed to infection do not succumb to the disease. For example, on the permanent grass land the plots which receive phosphates and potash now carry a vegetation of which in some years one-half consists of clovers and other leguminous plants. These grow year after year in the same place and never show any signs of clover sickness. Even on the grass paths which divide the small plots of excessively clover-sick land clover grows freely enough, though it is promptly killed out on the cultivated land adjoining. In all these cases of land sickness the intervention of biological factors has to be considered. The prime cause of some disease characteristic of the plant may accumulate in the soil, and the parasite may not only be fungoid, but may be a higher organism like a nematode or a protozoon, about which we have little information as yet.

There can be little doubt but that there is some agency, biological or otherwise, in the soil which diminishes the vigour of a plant when it is placed upon land which has carried the same or an allied crop for one or more years previously. Various examples of the special freedom with which a plant starts on land which for some time previously has not carried the crop in question are on record at Rothamsted whenever after a long course of cropping of one kind a change has been made. In all these cases the new crop makes a remarkable start; the seedlings grow away in exceptional numbers and with a vigour that is never seen in the ordinary course of cultivation. That this vigour is not simply due to a supply of plant-food which is available for the particular crop although it had not been utilised by the preceding one, is seen from the fact that this vigorous start is not always followed up by a large yield. The final yield is, in fact, little more than that which would have been expected from the manurial history of the land. It is the first start that is so remarkable, and that takes place equally upon the impoverished and on the highly-manured plots.

The Agdell field, which is cultivated on a four-course rotation, affords an interesting commentary on this question of the continuous growth of crops upon the same land and the consequent exhaustion of the soil. The rotation consists of turnips, barley, clover (or beans), wheat; and the experiment has been in progress since 1848, or for sixteen complete rotations. During the last course the following crops, as set out in Table IV., were obtained from the unmanured plot:—

TABLE IV.—AGDELL ROTATION. UNMANURED SINCE 1848.
SIXTEENTH COURSE, 1908-1911.

Year.	Crop.	Produce per acre.
1908 . .	Roots (Swedes)	0·3 ton.
1909 . .	Barley grain	10·0 bush.
" . .	Barley straw	11·3 cwt.
1910 . .	Clover hay	17·4 cwt.
1911 . .	Wheat grain	24·5 bush.
" . .	Wheat straw	21·4 cwt.

It will be seen at once that the different crops possess very unequal powers of developing under the extreme conditions of soil impoverishment that must prevail on this land. The wheat crop grows remarkably well, and though the season of 1911 was generally favourable to wheat on the Rothamsted soil, yet the yield of 24·5 bushels is very large as compared with 12·5 bushels on the continuously cropped unmanured plot in Broadbalk field. The comparison, however, is not exact, for the crops on this plot of turnips and, generally, of clover are so small that for two years out of the four the land is practically fallow. Moreover, the clover leaves behind some nitrogen drawn from the atmosphere for the benefit of the succeeding wheat crop, and the growth of clover in 1910 had been altogether exceptional. But even after making all these allowances, the wheat crop does maintain its yield in a quite exceptional fashion on this impoverished land.

The barley is very much poorer, and though its yield is still well above that of the unmanured plot in Hoos field on which barley is grown continuously, it is still no more so than might perhaps have been expected from the year of fallow which immediately precedes it, for, though turnips are grown, the crop obtained is practically negligible and takes very little out of the soil.

The clover crop is, as a rule, a minimum one, and there is sometimes a difficulty in carrying the plants through the winter, four years being rather a short interval for the repeated growth of clover on the Rothamsted land, but even when a satisfactory plant remains in the spring it makes little or no growth. The season of 1910 presented a very curious feature, in a very abundant second growth of clover on this plot, as, indeed, elsewhere upon the farm. The year will be remembered as a season of continual small rains and low temperatures. The first cut of clover on the plot in question was of the usual minimal character, 1·6 cwt. per acre, though a plant existed, as may be seen by its yield of 15·8 cwt. at the later cut.

The impoverishment of the soil tells most heavily upon the turnip crop, which in the later years of the rotation has never reached a ton to the acre. There is no difficulty in getting a plant, but the individual turnips never form a bulb and only give roots like over-grown radishes. From these trials it will be seen that when land has been very much depleted of its available food by continual cropping without manure, wheat is the crop best able to maintain itself; barley comes next, and then clover, while turnips are hardly able to make any growth in the impoverished soil. These facts may be correlated with the habits of growth of the various plants: wheat is comparatively deep rooted and occupies the land for a long period, so that it is able to search the soil very thoroughly for whatever nutrient substances may be there. Barley has both a shallower root system and a more restricted period of growth; clover, though it occupies the land for an even longer period than the wheat, has a still shallower root system than barley. The most dependent of all, however, upon an immediate supply of active plant-food is the turnip crop, which has a small and shallow root system and a short period of growth taking place in the summer months when there is least water in the soil to bring about movements of plant-food.

The Effect of Different Systems of Farming upon the Fertility of the Soil.

In the preceding section the results reported give some idea of the extent to which the productiveness of the soil is increasing or falling under different systems of manuring, but the Rothamsted experiments also throw light upon the more general form of the same question—the extent to which the fertility of the land is improved or depreciated under different systems of farming. Roughly speaking, we may distinguish three distinct methods of dealing with the land, though natur-

ally there is no sharp line of demarkation to be drawn between one and the other, and all kinds of intermediate cases occur. In many of the newer countries a simple exploitation of the natural wealth of the soil is being conducted. The farmer starts with land rich in the accumulations of many ages of natural vegetation, and, having cleared it, proceeds to take off successive crops of saleable products, generally wheat and maize, without returning anything to the soil. In some cases the straw is ploughed in and only the grain is sold; but in others even the straw is burnt, so that every crop causes a considerable draft upon the original resources of the soil until exhaustion must eventually set in, though so enormous is the original stock of plant-food that no appreciable falling off in production may take place during the first generation. Nevertheless the land does begin to lose its stock of fertility, and in the middle West of North America where wheat and maize have been grown alternately for the last fifty or seventy years the land is now recognised as being appreciably poorer. A very similar state of affairs is taking place in the English Fens. There the black soils which have arisen from the decay of many generations of marshy vegetation are very rich in nitrogen and give rise to large crops, but in some cases the black soil is beginning to be exhausted and the farmers are touching the beds of clay which underlie the whole Fens. Simultaneously the fertility of the land is falling off and the farmer will soon cease to be able to keep on removing cereals, roots, and other crops without putting back anything into the soil. These cases of the exploitation of very rich virgin soils shade off gradually into other examples of wasteful farming upon comparatively inferior land, on which it is the practice to crop or graze continuously without the restoration to the land of any of the fertilising constituents that are removed, but when this happens the farmer has to be content with a very low level of production.

A second stage in agricultural development comes when the farmer can no longer continue economically his exploitation of the resources of the soil, but is driven to adopt a system of farming which conserves the fertility of the land. Perhaps the best example of this is seen in the old four-course rotation, before the introduction of artificial fertilisers. Under this system the only plant-food which left the soil was that contained in the wheat and barley grain sold, together with that contained in the live stock which had also been raised upon the farm. The plant-food removed was only a small proportion of the material taken out of the land, because the straw was consumed or trampled down to manure. The hay and the turnips were both fed, and similarly found their way back to the land, with

the exception of the ten per cent or so of their content in nitrogen and phosphoric acid which were retained by the animals. There were, in addition, certain wastages due to loss of nitrogen in dung-making; but on the other hand the farm had to be credited with the nitrogen gained from the atmosphere by the growth of the clover crop, so that it is found by experience that the land over a long period showed little or no depreciation in fertility, but was able to maintain a constant if somewhat low level of production. It is, however, important under such a system that only corn and meat should be sold, because the root-crops, the straw and the hay, contain far more plant-food than the cereal grain. Hence the prohibition in the older covenants of the sale of hay, straw, and roots, because no means were originally known of making up for the big drafts of plant-food thus occasioned.

With the introduction of artificial fertilisers and foreign-grown food-stuffs, which, roughly speaking, began to take effect about 1840, a more intensive system of farming became possible. Not only has the general level of production been thereby raised, but on many farms we now see the constant addition to the land of more plant-food than is taken away in the crops. If we draw up a balance-sheet for the modern potato-grower, or even the farmer with an extensive cake bill, we find that he is not only returning to the land the nitrogen, phosphoric acid, &c., which leave his farm in the shape of corn and wheat or milk, but that he is actually bringing on to it in the shape of purchased fertilisers or feeding-stuffs an excess of these indispensable constituents of the soil, and we may expect, unless the wastage also becomes increased, that the land will be steadily gaining in fertility therefrom.

The Rothamsted experiments provide certain examples which enable one to draw some conclusions as to the gain or loss of fertility under these different systems. We may take as our first example the unmanured plot upon the wheat field. Here everything is being taken away from the land, both corn and straw; the only part of the crop which gets returned is the roots and stubble that are ploughed in. No fertiliser is being added except the small amount (under 4 lb. per acre per annum) of nitrogen which is brought down by the rain. We have already seen that as soon as the active plant-food—what a farmer would call the “condition” of the land—has been cropped out, the crop falls to a low level and maintains that level over a very long period without much further falling off. The curve of production does, as we have said before, show some indication of a slow secular decline, but there is nevertheless almost a state of equilibrium with a constant production in the neighbourhood of 12 bushels of wheat-grain per acre per annum. In order to

obtain some information as to the soil, we can examine a number of analyses made at different periods and take out the figures showing the change in the proportion of nitrogen over a period of thirty-nine years from 1865 to 1904, and these are set out in Fig. 56. Table V. shows a balance-sheet of the nitrogen received and taken away, from which it appears that the proportion of nitrogen in the soil is steadily if slowly declining, and that the amount removed by the crop is almost exactly accounted

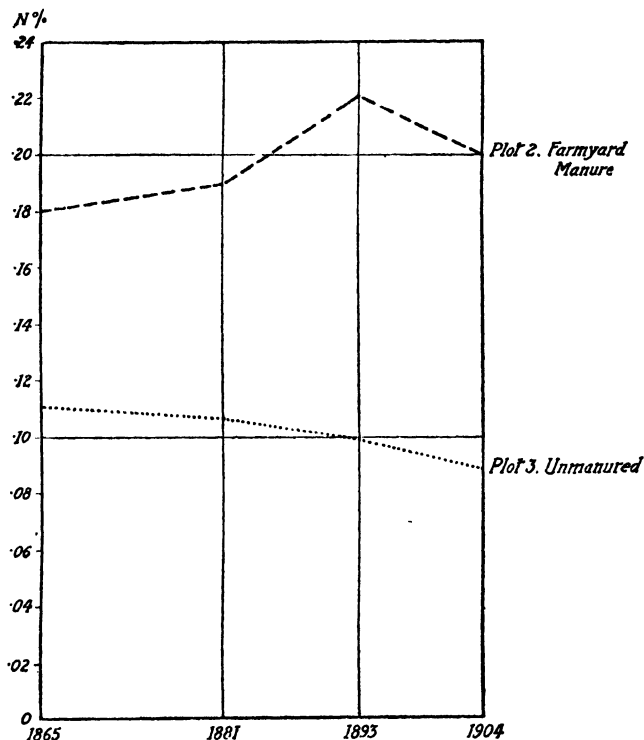


Fig. 56.—Percentage of Nitrogen in Broadbalk Wheat Soils, 1st 9 inches, at successive dates.

for by the loss to the nitrogen in the soil and the amount brought down by the rain. There is, indeed, about 100 lb. per acre of nitrogen less in the soil of the unmanured plot at the end of the period than we should have expected, and although this quantity is in itself far too small to be significant, since it would be more than covered by the inevitable errors of sampling and analysis, we have also to remember that there are various losses to the soil not brought into the account. For example, there is some annual removal of nitrogen in the

weeds that are taken off the plot; there is also some loss by drainage, for analysis shows that the drainage water coming from this plot does contain a small but appreciable quantity of nitrate, especially during the autumn months. We must conclude, therefore, that there are some recuperative actions at work bringing nitrogen back into the soil, enough to balance what we may call the wastages of nitrogen, other than the direct removals by the crop. Of course there will also be losses of phosphoric acid and potash—losses which cannot be replaced spontaneously, because there is no untapped reservoir of these constituents at hand like the nitrogen in the atmosphere. The removals of phosphoric acid are, however, not very great compared with the stock originally in the soil, and the losses of potash are insignificant, especially considering that the Rothamsted soil contained at the outset something like 20 tons

TABLE V.—NITROGEN IN SOIL, LB. PER ACRE. BROADBALK WHEAT-FIELD.

In soil, 1865.	In soil, 1904.	Gain or loss in 39 years.	Added in manure.	Added in rain.	Removed in crop.	Unaccounted for.
PLOT 3.—UNMANURED.						
2847	2292	— 555	...	150	601	— 104
PLOT 2.—FARMYARD MANURE.						
4468	4975	+ 507	7800	150.	1989	— 5454

of potash per acre in the top 9 inches. We may therefore fix our attention chiefly on the nitrogen as determining fertility; the recuperative actions restoring nitrogen we will deal with later.

We now take the case of the plot upon the same wheat field which receives each year farmyard manure containing about 200 lb. of nitrogen, whereas on the average only about 50 lb. are taken away in the crop. As we have said before, the production for some time tended to rise, but for the last fifty years it has remained at a very constant level and has fluctuated no more than might have been expected from the changing seasons. The crop has, in fact, reached an equilibrium, this time an equilibrium at a level of production of about 38 bushels instead of the 12 bushels that are attained without manure. If now we take out a similar balance-sheet, Table V., for the nitrogen content in the soil of this plot, we

find that in the same period of thirty-nine years no less than 7800 lb. of nitrogen have been added, while 1990 lb. have been removed in the crop. Analysis of the soil, however, shows only an accumulation of 507 lb. over the whole period, so that no less than 5450 lb. are unaccounted for either in soil or crop and must be regarded as lost. The 1893 analysis would indicate that the plot has gained no nitrogen whatever between 1893 and 1904, as though it had reached a maximum before the earlier year. Some sources of loss we have already indicated—namely, weeds and drainage water—but we have evidence that the loss of nitrogen on this plot is chiefly due to certain groups of bacteria which break up organic matter containing nitrogen and set free nitrogen gas. These bacteria are particularly active when the soil is rich in organic matter, as it has become on this plot. We here see an example of a very general state of affairs, that as soon as the land reaches a high pitch of fertility a number of wasteful actions, chiefly bacterial, in the soil become greatly stimulated with each increase in fertility. When the land is thoroughly impoverished, as on the unmanured plot, the wasteful actions are balanced, or even a little exceeded, by natural recuperative actions fixing atmospheric nitrogen. But when the land is rich enough to yield an average of something like 5 quarters of wheat per acre, and is under arable cultivation, the losses or the wasteful actions may get rid of as much as 100 lb. of nitrogen per acre per annum. Of course it has always been recognised that when the manuring is high we recover in the crop a smaller proportion of the plant-food applied; but these figures also show that as regards nitrogen at any rate the unused excess is not stored in the soil, but gets washed out or converted into the useless form of nitrogen gas. Now the rich dunged soil of this wheat plot resembles in the changes it undergoes the virgin soils which had accumulated nitrogen before they were brought into cultivation. As soon as they are put under the plough not only is there removal of nitrogen in the crop, but the wasteful actions of which we have been speaking set in, and the soil is depleted of three or four times as much nitrogen as is actually recovered in the crop grown upon the soil. Hence the comparative rapidity with which these virgin soils are found to deteriorate, considering the enormous stock of nitrogen with which they start. We may, in fact, take it as a general axiom that arable soil is subject to wasteful losses of nitrogen which increase in extent with each increment of fertility. If land is capable of raising 4 quarters of wheat to the acre and we wish to bring it into a condition to yield 5 quarters, we have to add not merely the amount of nitrogen

contained in the additional quarter but very much more, and, moreover, we have to keep up the high manuring year after year in order to compensate for the wastage on the higher scale that now takes place.

The last case is a good example of the wasteful actions which go on in rich soil under arable cultivation. We may now look for a little more enlightenment about the recuperative actions which we saw took place in the soil of the unmanured plot. We saw some evidence in that case that there had been a gain of nitrogen, presumably from the atmosphere since no other source is open. Now all the evidence is against the idea that a plant like wheat can itself obtain nitrogen directly from the atmosphere and bring it into combination, but we are aware that atmospheric nitrogen can be fixed, *i.e.*, brought into combination, not only by certain bacteria which live in symbiosis with the leguminous plants, but also by other bacteria which exist free in the soil. These bacteria, *Azotobacter* and its allies, exist numerous enough in the Rothamsted soil, but certain conditions are necessary before they can effect any considerable fixation of nitrogen. In the first place they must be supplied with lime and mineral plant-foods, and, above all, there must be a supply of readily attackable organic matter by the oxidation of which they obtain the energy necessary to bring nitrogen into combination. *Azotobacter* is a powerful oxidising organism, and in the laboratory we find that the amount of nitrogen it fixes is proportional to the amount of sugar, starch, or other carbohydrate which it burns up. Now on the unmanured wheat plot, although the *Azotobacter* is present, there is but a very small supply of carbohydrate, only as much as is contained in the little residue of roots or stubble turned into the soil every year. In consequence, the amount of fixation is small, barely sufficient, as we have seen, to balance the annual wastage which takes place on this plot. There are, however, at Rothamsted, two portions of land which originally belonged to the Broadbalk and Geescroft experimental fields, but have been allowed to grow wild since 1881. The crops were not harvested and nothing has been sown, but a very few years sufficed to cover the land with weeds and to starve out the remains of the original crop, until at the present time the areas are tangles of rough vegetation—almost exclusively grass in the case of Geescroft, but containing a considerable proportion of leguminous herbage in the case of Broadbalk. The vegetation has neither been cut nor grazed by stock, but allowed to decay *in situ* year after year. In 1904, after twenty-three years of this neglect, samples of soil were taken and analysed to compare with samples which had been

preserved since 1881 when the land was left to itself. Table VI. shows the results, and it is seen at once that there has been a remarkable gain of nitrogen, altogether

TABLE VI.—LAND ALLOWED TO RUN WILD. NITROGEN IN SOIL,
LB. PER ACRE.

	In soil to 27 inches.		Added by rain.	Gain in soil per annum.
	1881-3.	1904.		
Broadbalk, 1881 . . .	5910	8110	88	92
Geescroft, 1883 . . .	6040	6980	80	41

different from that on the plots from which the crop has been removed year after year. The gain is greatest on Broadbalk, and this might be set down in part to the presence of leguminous plants on that area alone. The real difference, however, arises from the fact that, whereas the soil of Broadbalk contains about 3 per cent of carbonate of lime, the Geescroft field is almost devoid of that constituent, so that neither leguminous plants grow freely nor does the *Azotobacter* which is present in the soil in both places carry out its proper function of fixing nitrogen. Whatever the relative share of the two nitrogen fixing organisms, they are both largely dependent upon the presence of carbonate of lime, and hence the greater fixation in the Broadbalk soil. The distinguishing feature, however, of these pieces of land which enables them to fix nitrogen so extensively is the annual return to the soil of the carbonaceous matter contained in the natural vegetation. In itself this would only restore the nitrogen which the vegetation had previously taken out of the soil during growth, but it further provides the *Azotobacter* with the material from which it obtains the energy necessary to bring nitrogen into combination. The *Azotobacter* in the wheat field from which the crop is removed every year can effect little fixation because of the absence of oxidisable organic matter, and the action is so great on these wastes because of the continual supply of fresh organic matter at the end of every season's growth. Now these are just the conditions which formerly prevailed in nature on the rich virgin soils. The deep black soils mostly occur in steppe countries which naturally carry a grassy vegetation and also have a subsoil rich in carbonate of lime. Under these conditions not only does carbon accumulate, but also nitrogen is continuously obtained from the atmosphere by the action of *Azotobacter*, the presence of which, or of some closely related

organism, has been detected in such black soils from nearly all parts of the world. Were it not for the *Azotobacter* the mere annual fall of the vegetation could not result in any accumulation of nitrogen, because the plant itself can only restore that which it had previously taken away. The gain of nitrogen comes through the intervention of *Azotobacter* and kindred organisms which are able to bring their nitrogen-fixing powers into action through the use of the carbonaceous matter derived by the plants from the atmosphere.

Not only do these plots at Rothamsted throw light on the accumulations of nitrogen in the virgin soils, but they help to explain the value of laying down land to grass for a shorter or longer period before bringing it into rotation again. Of course when the seeds consist of clover and are only left down for one or two years, we may be certain enough that the gain of nitrogen, manifest as it is in the succeeding crops of the rotation, is due to the bacteria associated with leguminous plants, but in the custom which is so common in north-country farming of leaving the land in grass for five, six, or seven years, and then taking three years of arable cultivation, there is not the same dominance of the leguminous plants. Yet, as every farmer knows, the land not only gains in its mechanical condition during the time it lies under sod, but it also becomes enriched to such an extent as to want little further nitrogenous manure during the years of cropping. In all probability nitrogen has been accumulating through the agency of *Azotobacter*, which itself depends for its action upon the carbonaceous matter accumulated in the roots and stubble of the grass crop. Experiments are now in progress to test these points rather more rigorously; the difficulties are to preserve a purely grass turf without the creeping in of any leguminous plants, for they would render the conclusions doubtful, and also to get sufficient accumulation of nitrogen in three or four years to detect by analysis, all analyses of the soil being subject to considerable errors arising in the sampling. Certain other experiments are also in progress on arable land to see if the addition of pure carbohydrate containing no nitrogen will not eventually lead to an increased crop after the *Azotobacter* has had time to become effective and the nitrogen compounds first formed have further changed into forms available for the plant. At first the experiments were negative, but lately a considerable rise in production has been observed, and the change is attributed to the fact that at first the carbohydrate was added to the soil in the early spring, whereas latterly it has been put on in the autumn immediately after the cereals are removed. At that time the soil is at a high temperature and *Azotobacter* is active; in the spring-time

when the soil is cold other organisms seize upon the carbohydrate and destroy it without fixing any nitrogen.

Neither of the above cases in the Broadbalk and Geescroft fields are strictly illustrative of the processes going on under ordinary farming, but some of the crops on Agdell field, which is farmed on a four-course rotation, do give rather more insight into what happens under the regular conservative systems of farming. We can pick out, for example, certain of the plots which receive no nitrogen but only mineral manures—phosphates and potash—put on once during the rotation in preparation for the turnip crop. There are four plots divided into pairs: on one pair the rotation is wheat, turnips, barley,

TABLE VII.—NITROGEN PER CENT IN SOIL OF AGDELL FIELD, ROTHAMSTED. THE PLOTS RECEIVE MINERAL MANURES, BUT NO NITROGEN.

	Fallow.		Clover.	
	Roots carted off, 13/14.	Roots returned, 9/10.	Roots carted off, 15/16.	Roots returned, 11/12.
1867. . .	0·1224	0·1240	0·1327	0·1380
1874. . .	0·1147	0·1238	0·1241	0·1321
1883. . .	0·1161	0·1228	0·1329	0·1383
1909. . .	0·1159	0·1195	0·1347	0·1498
1852-1903.				
Wheat, average	31·2 bush.	32·2	32·2	35·1
Clover, "	...	...	41·0 cwt.	47·7
Swedes, "	151·0 cwt.	268·0	160·0	187·0
Barley, "	22·1 bush.	28·7	24·5	34·5

clover; and on the other pair wheat, turnips, barley, bare fallow. On one plot, again, of each pair the root-crop is carted right away; on the other plot it is chopped up and ploughed into the soil in order to represent roughly what happens when the turnips are consumed upon the land. This alternative had to be adopted because the Rothamsted land is too heavy to admit of folding. The conditions are of course rather more favourable than if the roots were grazed off; a little more manure material gets returned to the soil, but still more so is the carbonaceous matter increased, for all that is contained in the turnip crop now gets back to the soil instead of being to a very large extent burnt up during its consumption by the animal. Table VII. shows the yield and the changes in the amount of nitrogen in the soil of these four plots, together with the average

production during the forty years 1852-1903. In this Table nitrogen only is considered because it is the only element of the plant's growth which can be renewed by natural agencies. An inspection of the Table shows that the plot from which the roots are carted, and on which no clover is grown, shows a small but probably real decline of fertility, though it is still capable of producing an average of nearly 32 bushels of wheat to the acre and 22 bushels of barley. If we now take the plot on which clover is also not grown but the roots are returned to the land, the annual production is considerably increased, and the analysis of the soil shows but a very slight falling off in fertility—no more, in fact, than would be covered by the errors of analysis. Again, on the plot which grows clover or beans every fourth year but from which the roots are entirely removed, there is a similar increase in total yield, with a very slight, almost imperceptible, increase in the soil nitrogen, certainly not one which can be trusted. One might almost say, in fact, that the two latter plots have reached a stationary condition in which the losses of nitrogen contained in the crops removed are replaced by the nitrogen introduced by bacterial agencies. The fourth plot, on which clover is grown and where the roots are put back into the soil, shows a still further increase in the production, and the analyses of the soil point distinctly to a slow rise in fertility. Here, then, we have a piece of land capable of producing an average of 35 bushels of wheat per acre, 34 bushels of barley, and nearly 2½ tons of clover-hay, all of which are removed from the land, which yet receives no nitrogen in the shape of fertilisers or purchased feeding-stuffs. The whole of the nitrogen necessary to maintain this level of production, which it may be noted is higher than that of the average land of Great Britain, is derived from the atmosphere by the growth of the leguminous crop once in every four years; and we also see that this production is not being attended by any loss of fertility, but by some very slight gain of nitrogen to the soil. Now under ordinary farming conditions the returns from the land would be somewhat greater than prevail upon this plot. It is true that the roots are cut up and wholly put back into the soil instead of being eaten, thus restoring the whole instead of about nine-tenths of the nitrogen taken out by the root-crop and also nearly 2 tons per acre of organic matter; but, on the other hand, the organic matter contained in the wheat and barley straw, and that voided by the animals consuming the clover-hay, does not find its way back to the soil as it would in practice. We may thus conclude that a farmer on land of this class who cultivates it on a four-course rotation and sells only wheat and barley grain and fat stock, may by the consumption of the roots, the straw, and the hay (whether

by folding upon the land or by making farmyard manure which is put back without unnecessary waste), be able to maintain his land at such a pitch of fertility as to be capable of producing over 30 bushels per acre of wheat and barley. This is the true conservative farming that was practised in Great Britain before the introduction of artificial fertilisers and feeding-stuffs, and we have every reason to suppose that it may be continued indefinitely without deterioration of the soil, provided the small losses of phosphoric acid and potash which cannot be renewed from the atmosphere are made up by bringing in some of the large stores of these substances which exist in various parts of the world. Looked at from the point of view of statistics, an average yield of 35 bushels of wheat and 34 of barley is a high one—a very high one compared with that obtained under the cheap extensive systems of farming prevailing in America and Argentina, &c., and even above the average obtained in Great Britain and other highly farmed countries. It involves, however, considerable expense for cultivation, an expense the extensive farmer is never called upon to face, and it is not the yield with which an enterprising British farmer would be content at the present time, whatever the statistical average of the country may show. Such a farmer wants to work at or above the 40-bushels per acre level if he is to be properly remunerated for the labour and capital he puts into his business, and to get up to such a level of production necessitates the introduction to the farm of some extraneous source of nitrogen such as purchased fertilisers or feeding-stuffs. We may summarise by saying that on average strong soils provided with lime the farm can be made self-supporting at the 4-quarter level of production, but requires extraneous nitrogen if it is to be brought up to the 5-quarter level.

Finally, we may conclude that with every system of farming a certain position of equilibrium will be reached (viewed over a term of years long enough to smooth out seasonal effects) when the natural recuperative agencies and the additions of fertilising material in the manure are balanced by the removals in crops and stock and the inevitable waste. The higher the level of production the greater will be the waste, and, in consequence, the additions of fertiliser must be doubly increased to maintain the balance. How high a level of production for a given soil and climate can be profitably maintained is determined by the prices that rule for the crops, but there will always come a limit when the production can be no longer increased by additions of fertiliser except at a loss; at such a stage only the introduction of improved varieties of seed, or some modification of the methods of cultivation that will induce a better

utilisation of the fertiliser, can still profitably increase the production per acre.

On examining the various farming systems in different parts of the country it will be found that farmers do instinctively adapt their expenditure on fertilisers (including feeding-stuffs), and, therefore, their level of production to the magnitude of the returns they can get for their produce. One man will have a large cake bill and spend 40s. per acre on artificial fertilisers during his rotation; he can afford a high level of condition and therefore of waste in his soil, because he can get good prices for potatoes or barley or sheep, whatever his staple products may be. But on poorer land and with less suitable markets a man may be driven to cut down his cake bill and spend only 10s. per acre on fertilisers, because his products are not valuable enough to compensate for the waste that sets in with a higher level of condition in the land. Thus the problem of what is a profitable manure for a given crop becomes a very complex one, and the biggest factor is perhaps the level of production at which the individual farmer can conduct his business remuneratively.

The Effects of Mineral Fertilisers.

From the abstract point of view there are three constituents—nitrogen, potash, and phosphoric acid—which have to be supplied in fertilisers and upon which the crop is equally dependent. In practice it is found that, owing to the stock of these plant-foods contained in all cultivated soils and the very different powers of the various crops to appropriate them, it is rarely necessary to supply the crop with all three of these constituents in the quantities that would be removed. Ville introduced the idea that each plant has a dominant fertilising constituent, and if this dominant is supplied the crop in question is able to satisfy itself as regards the other two constituents from a soil in an average state of fertility. For example, Ville regarded nitrogen as the dominant for wheat, since under ordinary farming conditions no fertiliser is likely to be of service to the wheat crop other than some kind of active nitrogenous manure. Similarly phosphoric acid is the dominant fertiliser for swedes, and many farmers are accustomed to grow their turnips with no other assistance than a dressing of superphosphate or basic slag. Ville's idea of a dominant, however, cannot be pressed very far, because many crops seem to require an all-round manuring, and in other cases the nature of the soil seems to dictate in the main the character of the fertiliser. We must, however, accept his principle to the extent of recognising that certain crops are especially dependent upon one particular constituent in a manure, to the extent that their yield will be

chiefly determined by the supply of that constituent. We may illustrate this point and the specific action of some of these fertilisers by a study of the production of the Agdell field, which, as explained before, is farmed on a four-course rotation of swedes, barley, fallow or clover, and wheat. The field is divided longitudinally, one portion carrying clover and the other being bare fallowed before the wheat crop; and it is again divided at right angles into a portion that has been unmanured since the beginning of the experiments in 1848, a portion which receives phosphoric acid and potash for the root-crop only, and a third portion which receives also for the root-crop the same phosphoric acid and potash, but in addition 141 lb. of nitrogen per acre as ammonium-salts and rape-cake. Table VIII. shows

TABLE VIII.—CROPS GROWN IN FOUR-COURSE ROTATION, AGDELL FIELD. PRODUCE PER ACRE 60TH TO 64TH SEASONS, 1907-1911.

Year.	Crop.	O.		M.		C.	
		Unmanured.		Mineral Manure.		Complete Mineral and Nitrogenous Manure.	
		5. Fallow.	6. Beans or Clover.	3. Fallow	4. Beans or Clover.	1. Fallow.	2. Beans or Clover.
1907 {	Wheat grain . bush.	16·3	21·4	19·1	36·8	25·1	29·3
	Wheat straw . cwt.	21·4	27·1	28·6	49·6	35·3	35·1
1908	Roots (Swedes) . cwt.	21·6	6·4	179·0	235·8	395·4	314·0
1909 {	Barley grain . bush.	11·4	10·0	17·4	22·1	26·8	33·4
	Barley straw . cwt.	10·1	11·3	12·7	16·9	18·7	23·8
1910 {	Clover-hay (1st crop) cwt.	...	1·6	...	24·1	...	32·2
	Clover-hay (2nd crop) cwt.	...	15·8	...	40·0	...	44·5
1911 {	Wheat grain . bush.	23·9	24·5	31·9	37·8	33·3	38·0
	Wheat straw . cwt.	20·4	21·4	28·6	33·5	29·3	32·5

the production of each of the plots during the last five years—*i.e.*, one completed course together with the preceding wheat crop. If we look at the production of roots we see at once how dependent the swede turnip is upon the supply of phosphoric acid. On the completely unmanured plots 5 and 6, the production is only at the rate of 21·6 and 6·4 cwt. per acre; on the plots 3 and 4 receiving phosphoric acid but no nitrogen these figures rise to 179 and 236 cwt. respectively. If we only consider plots 3 and 5, neither of which receive any nitrogen nor are sown with clover to collect nitrogen, the difference between the yield of 21 cwt. and 179 cwt. must be wholly due to the mineral manures supplied to plot 3, and we have

other evidence to show that it is the phosphoric acid and not the potash which is mainly responsible for the difference. Now both these plots must be very greatly impoverished as regards nitrogen, none of which has been supplied to either plot for sixty years, but given an ample supply of phosphoric acid the swede is still able to obtain from the soil sufficient nitrogen to grow a crop of about 10 tons per acre of roots. There is no such superiority in the yield of wheat or barley on these two plots as compared with the wholly unmanured plots, hence we might admit that phosphoric acid is the dominant fertiliser for swedes but not for the cereals. That nitrogen is also a factor in the production must be seen from the fact that on plot 4 236 cwt. are produced, a gain of 57 cwt. above plot 3. Both these plots are equally supplied with an excess of phosphoric acid; the difference comes from the clover which was grown on plot 4 two years previously, and has left behind a nitrogenous residue not completely exhausted by the preceding wheat crop. Again, on plots 1 and 2, which receive the same amount of phosphoric acid, but also nitrogen, the yield rises to 314 and 395 cwt. respectively, so that when the crop's demand for phosphoric acid is fully satisfied nitrogen becomes the factor which determines the yield. The prime dependence of the swede crop upon phosphoric acid may further be illustrated by the two unmanured plots 5 and 6; they both yield little or nothing, but the yield on 6 is always very much less than that on 5. Now 6 is the plot which, though unmanured, does gain a little nitrogen from the growth of clover, and this increase in nitrogen always shows itself in a larger yield in the succeeding crop of wheat; for example, 21·4 bushels in 1907 against 16·3 bushels on the other plot on which clover is never grown. The increased growth of wheat, however, having been forced by the addition of nitrogen alone, means a corresponding increase in the amount of phosphoric acid and other mineral plant-foods taken out of the soil, so that this plot, though enriched in nitrogen, does thereby become more impoverished in phosphoric acid, and as soon as the turn comes for the swede crop, which is determined in the first place by the amount of phosphoric acid available, its yield falls to the minimum.

The other crops on this field do not illustrate any specific action of fertilisers, except that we can also see how clover is dependent upon the supply of minerals and is not affected by nitrogenous fertilisers. The year 1910 was especially favourable for clover, and with no manure at all the yield of hay reached the exceptional figure of 17 cwt. With the mineral manures, however, it increased to 64 cwt. and to 76 cwt. on the plot which received nitrogen as well as minerals, the application of fertiliser having been made in both cases two years previously, the excess on the latter plot being somewhat of an accident, for

the average over the whole period only shows a difference of 4 cwt.

For another illustration of the importance of phosphoric acid we may turn to the barley grown on the Hoos field. Table IX. shows the mean results obtained on the three series which all

TABLE IX.—BARLEY, HOOS FIELD. AVERAGE YIELD, 60 YEARS, 1852-1911.

Plot.	Manures.	Dressed Grain.	Straw.
		bush.	cwt.
1 A	Ammonium-salts alone	25·4	14·7
2 A	Superphosphate and Ammonium-salts	38·1	22·0
3 A	Alkali-salts and Ammonium-salts	28·0	16·9
4 A	Complete Minerals and Ammonium-salts	41·5	25·1
1 N	Nitrate of Soda alone	29·3	17·9
2 N	Superphosphate and Nitrate of Soda	43·0	26·3
3 N	Alkali-salts and Nitrate of Soda	30·0	19·3
4 N	Complete Minerals and Nitrate of Soda	42·6	27·2
1 C	Rape-cake alone	38·3	22·2
2 C	Superphosphate and Rape-cake	40·4	23·6
3 C	Alkali-salts and Rape-cake	36·9	22·4
4 C	Complete Minerals and Rape-cake	40·5	24·5

received 43 lb. of nitrogen, in the one case *N* as nitrate of soda, and *A* as ammonium-salts, and in the third *C* as rape-cake. The plots are thus all alike as regards their nitrogen supply, but plot No. 1 gets nothing else, to No. 2 superphosphate is added, to No. 3 sulphate of potash, while No. 4 receives a complete fertiliser containing both phosphoric acid and potash in addition to the nitrogen. We thus get two comparisons—1 and 2 without potash but differing from one another in that 2 receives phosphoric acid and 1 does not; 3 and 4 with both nitrogen and potash but 4 with phosphoric acid and 3 without. Table IX. shows that the addition of phosphoric acid raises the yield of grain from a mean of 31·0 bushels on 1 to 40·5 bushels on 2, and from 31·6 on 3 to 41·5 bushels on 4, while the yields of straw show a similar progress. These figures demonstrate very clearly that barley depends very much on an adequate supply of phosphoric acid; it is, in fact, one of the crops upon the farm which is likely to respond to a phosphatic fertiliser and to fail to give an adequate yield unless the soil is adequately supplied with this constituent. The appearance of the plots also shows very clearly the effect of the phosphoric acid;

where it is lacking the barley is a week or ten days later in filling the ear and in ripening than on the plots receiving phosphoric acid, and if we choose the right time we may see the whole of the ears on the plots receiving phosphoric acid turned down and beginning to colour, while the ears on the plots without phosphoric acid are still green and upright. This illustrates in a remarkable degree one of the properties of phosphoric acid, its effect in inducing maturity and hastening on the crop to complete ripeness. Whenever it is necessary to get any crop to mature early and thoroughly, it is well to provide an ample supply of phosphoric acid, and very great changes in the character and value of certain crops may sometimes be effected by this fertiliser. If we turn to the wheat plots we do not find quite the same returns from phosphoric acid; the comparisons are not so complete as in the case of barley, but the following Table X. shows the produce from

TABLE X.—BROADBALK WHEAT. AVERAGE YIELD, 10-YEAR PERIODS, 1852-1911.

Plot.	Abbreviated Description of Manures.	Averages for						
		10 years, 1852-1861.	10 years, 1862-1871.	10 years, 1872-1881.	10 years, 1882-1891.	10 years, 1892-1901.	10 years, 1902-1911.	60 years, 1852-1911.
DRESSED GRAIN.								
10	{ Double Ammonium-salts alone }	bush. 23·2	bush. 25·1	bush. 17·3	bush. 19·4	bush. 18·4	bush. 18·4	bush. 20·3
11	{ Double Ammonium-salts and Superphosphate }	28·4	27·9	21·7	22·7	19·5	19·2	23·2
12	{ Double Ammonium-salts and Superphosphate and Sulph. Soda }	33·4	34·3	25·1	30·1	26·7	27·4	29·5
13	{ Double Ammonium-salts and Superphosphate and Sulph. Potash }	32·9	34·8	26·8	32·5	29·6	32·0	31·4
STRAW.								
10	{ Double Ammonium-salts alone }	cwt. 24·5	cwt. 21·9	cwt. 15·2	cwt. 15·8	cwt. 16·2	cwt. 18·0	cwt. 18·6
11	{ Double Ammonium-salts and Superphosphate }	28·2	24·5	21·3	20·8	18·8	21·8	22·6
12	{ Double Ammonium-salts and Superphosphate and Sulph. Soda }	34·2	30·5	25·0	27·3	24·0	28·6	28·3
13	{ Double Ammonium-salts and Superphosphate and Sulph. Potash }	34·4	33·4	27·6	31·9	28·6	35·9	32·0

plot 10 with nitrogen only, and plot 11 with nitrogen and superphosphate, during the last six periods of ten years each. The gain for phosphoric acid amounts to 2·9 bushels, or 14 per cent, as against 38 per cent on the corresponding barley plots 1 and 2. Again, in the case of mangolds we have a comparison between plots 1 which received farmyard manure and nitrogen only, and plots 2 which received superphosphate in addition for the 19 years of 1876-94, Table XI. In this case

TABLE XI.—MANGOLDS, BARNFIELD. EFFECT OF MINERAL MANURES WITH DUNG.

Series.	Average 19 years, 1876-1894.		Average 17 years, 1895-1911.	
	Dung only. Plot 1.	Dung and Phosphoric Acid. Plot 2.	Dung only. Plot 1.	Dung, Phosphoric Acid, and Potash. Plot 2.
	tons.	tons.	tons.	tons.
Dung	16·77	17·01	19·89	21·14
Dung and Nitrate Soda	23·21	24·23	29·66	29·30
Dung and Ammonium-salts . . .	22·11	21·36	22·79	27·75
Dung, Ammonium-salts, and } Rape-cake }	24·50	23·46	25·20	31·53
Dung and Rape-cake	23·63	23·29	26·02	30·00

the superphosphate has been without effect upon the average yield of the five plots over the 19 years, the dung alone being able to supply all the phosphoric acid that is necessary for the mangold crop.

Now it will be noticed that the two crops, swede turnips and barley, upon which phosphoric acid has such a beneficial effect are both of them shallow rooting, whereas mangolds and wheat, which respond very little to phosphoric acid, are characteristically deep rooting and traverse the soil very thoroughly. One is driven to suspect a causal relationship between these two facts, and this opinion is strengthened by the observation both in the field and in the laboratory experiments which are still in progress, that a supply of phosphoric acid does seem to stimulate the root development and tillering of the plant during its very early stages. The effect passes away afterwards, and if the conditions are at their best for both sets of plants, the one short of phosphoric acid may catch up and give an equal yield. In practice, however, the little extra stimulus at the start to the root development may make an extraordinary difference in the number of plants that sur-

vive should the conditions be trying, and consequently may bring about a very large increase of yield. For this reason, in practice a good return is often obtained from superphosphate upon crops like mangolds, which are comparatively independent of phosphoric acid as regards their later growth. The plant brairds better for the fertiliser, and so ultimately produces a larger crop.

As phosphoric acid has been shown to have such a marked effect in bringing the crop to maturity, we might expect it to exert its maximum of action in a comparatively wet and cool season, and on examination of the Rothamsted records a very marked fluctuation in the value of superphosphate is found to take place according to the character of the seasons. We may illustrate this, in the first place, by picking out the results of two seasons, 1893 and 1894, which were in marked contrast, 1893 being one of the driest summers of the whole series and 1894 wet and cool. Table XII. shows the results

TABLE XII.—EFFECT OF PHOSPHORIC ACID AND POTASH UPON BARLEY AT ROTHAMSTED. WET 1894, AND DRY 1893, YEARS COMPARED.

	Grain, bushels.		Grain to 100 Straw.		Nitrogen per cent in Grain.	
	1893.	1894.	1893.	1894.	1893.	1894.
Ammonium-salts alone	11·6	10·4	85·3	67·5	2·19	1·65
Ammonium - salts and Superphosphate	18·1	34·9	101·0	77·0	2·13	1·60
Ammonium - salts and Potash	16·8	17·8	85·9	73·8	2·17	1·61
Ammonium-salts, Super- phosphate, and Potash	30·8	41·4	102·2	77·7	2·08	1·44

obtained with barley. It will be seen that in the dry year superphosphate raised the production from 11·6 bushels on plot 1 to 18·1 bushels on plot 2. In the wet season, however, the corresponding rise was from 10·4 to 34·9 bushels. Again, taking the plots also receiving potash, the rise of crop was from 16·8 to 30·8 bushels in the dry season, but from 17·8 to 41·4 bushels in the wet season. In both years the value of the superphosphate in raising the proportion of the grain to straw was manifest, though not more so in the wet than in the dry season; but in the wet season it will be seen that the presence of superphosphate on plot 4 brought about a notable improvement in the quality of the barley by reducing the percentage

of nitrogen. Turning now to wheat, and again picking out a wet and dry season, Table XIII. shows the results obtained

TABLE XIII.—EFFECT OF PHOSPHORIC ACID AND POTASH ON THE DEVELOPMENT OF WHEAT. BROADBALK FIELD, ROTHAMSTED.

Plot.	Manuring.	Grain, bushels.	Straw, cwt.	Weight per bushel, lb.	Grain to 100 Straw.
WET SEASON, 1879.					
3	Unmanured	4.5	6.7	51.8	42.8
10	Ammonium-salts only	4.3	8.5	50.8	33.6
11	Ammonium-salts, superphosphate	11.1	18.0	54.6	36.2
13	{ Ammonium-salts, Superphosphate, Sulphate of Potash }	16.0	27.2	57.8	35.2
DRY SEASON, 1893.					
3	Unmanured	10.7	5.6	62.5	110.3
10	Ammonium-salts only	8.4	5.6	59.1	84.4
11	Ammonium-salts, Superphosphate	7.7	6.2	56.4	67.3
13	{ Ammonium-salts, Superphosphate, Sulphate of Potash }	16.4	9.7	62.6	98.0

on four of the plots during 1879, the wettest summer recorded at Rothamsted, and 1893, one of the driest. In the wet season the phosphoric acid more than doubled the yield, added nearly 4 lb. to the weight per bushel, and increased the proportion of grain to straw. In the dry season the phosphoric acid was positively harmful, because it hurried the grain to a premature maturity and caused it to ripen before it was fully grown out. Thus the yield of grain, its weight per bushel, and the proportion it bore to the straw, were actually reduced through the application of superphosphate. These are results obtained in picked individual years, but it has proved impossible to find a more general correlation by comparing the results of all the years with their corresponding rainfall, either for the whole season or particular summer months alone. This is due to the fact that a mere rainfall record gives very little information about the character of the weather; for example, June 1911 was really a month of heat and drought, yet, owing to thunderstorms, its rainfall record was 2.736 inches, almost as

great as June 1910 (2·806 inches), a month of exactly opposite character in its effect upon vegetation.

This conclusion as it stands is of course of no service to the farmer, because since he cannot be aware whether to expect a wet or dry season he is not able to adjust his supply of phosphoric acid to meet it. However, we can extend the conclusion to cover the case of climate and soil instead of season, and draw the deduction that phosphoric acid will give the greatest amount of response and is most necessary on soils which are wet and heavy either on account of their texture or because of the situation and climate that normally prevails.

Turning now our attention to the question of potash we find a similar selective action upon different corps. Speaking generally, we know both from experiment and from ordinary farming experience that potash has a very beneficial effect upon mangolds, potatoes, and the leguminous crops. It further often increases the yield of turnips, but has very little effect upon either wheat or barley. If we refer to the experiments with mangolds at Rothamsted, Table III., we shall see that when mangolds were grown without dung, and where the nitrogenous manure was ammonia, rape-cake, or a mixture of the two, the addition of superphosphate produced practically no increase in the crop, but the further addition of potash resulted in an extraordinary rise of production, until the yield of dry matter, particularly of sugar, was very nearly doubled. Where ammonium-salts form the source of nitrogen the production rises from 7·3 to 15·1 tons (*5 A* compared with *4 A*) for the addition of potash; with rape-cake the increase is from 11·1 to 22·4 tons (*5 C* and *4 C*); with both ammonium-salts and rape-cake, potash raises the yield from 10·0 to 27·1 tons (*5 A C* and *4 A C*). These figures, of course, show an exaggerated return for the application of potash, for though the soil at Rothamsted is a strong one, rich in potash to begin with, the experiments have been going on so long that the readily available potash has been reduced to a minimum in those plots which have been receiving nothing but nitrogen and phosphoric acid year after year. Under ordinary conditions of farming, except on the very lightest soils, we should never expect any such return as this from a dressing of potash. We may, however, get nearer to the normal state of things by examining the results obtained on those plots which also receive farmyard manure, as shown in Table XI., when farmyard manure is alike used on both plots. We have already seen that the addition of superphosphate alone brought about no particular increase, but superphosphate and potash together, as the second half of the Table shows, caused considerably greater yields. Farmyard manure is usually regarded as containing an abundance of potash for the require-

ments of ordinary crops, but these Rothamsted figures show that the addition of a fertiliser containing potash results in a marked increase in crop, even when farmyard manure has been supplied year after year so that its residues accumulate, and the soil is also naturally rich in potash. Nothing could more strongly indicate the fact that when the conditions are favourable for a big mangold crop the rapidly growing plant cannot obtain from the soil alone, however rich in potash, sufficient for its requirements.

Turning now to wheat, Table X. shows the yields upon the plots receiving nitrogen only, nitrogen and phosphoric acid, and nitrogen and potash for the six ten-year periods since 1852. It will be seen that the lack of potash reduced the crop considerably on plot 11 compared with plot 13 which received a complete manure from the outset, but the declining yield due to lack of potash becomes greater in the later years of the experiment as the original stock of potash in the soil on plot 11 gets more and more drawn upon. This plot is becoming steadily depleted of its potash because a crop containing potash is being taken away each year, and only nitrogen and phosphoric acid are being put on. So great, however, is the store of potash in the soil that there is almost as much available in the later years of the experiment as in the early, although in neither case is there sufficient for the needs of the crop. Table IX. shows a similar state of figures for barley upon Hoos field, and in this case the effect of the potash is very much less marked. Plot 2, with nitrogen and superphosphate, only yields a bushel or so less than plot 4, which receives a complete manure, and this equality continues down to the last years of the experiment. Thus when barley is supplied with nitrogen and phosphoric acid it is able to obtain from a strong soil like that of Rothamsted sufficient potash for its needs, even though none be supplied over a period of fifty years' continuous cropping.

Returning to the results upon mangolds, Tables III. and XIV., and comparing those given by plots 4 *N* and 5 *N* on which nitrate of soda forms the source of nitrogen, it will be noticed that the lack of potash does not cause any such decline in the yield as is shown by plots 4 and 5 in the series *A*, *A C*, and *C*, where rape-cake or ammonium-salts are the sources of nitrogen. Again, with the barley on Hoos field (Table IX.), though lack of potash does cause a very slight falling off of yield in plots 2 as compared with plots 4 in series *A* and *C*, where ammonium-salts and rape-cake are the sources of nitrogen, there is approximate equality with and without potash on plots 2 and 4 *N*, where nitrate of soda is a source of nitrogen. Thus we have evidence that even with mangolds, a plant which above all others requires a large quantity of potash,

the plant can get that potash out of the stores in the soil when nitrate of soda is used as a source of nitrogen. It must not be supposed that the soda in the nitrate of soda can do

TABLE XIV.—MANGOLDS, BARNFIELD. INCREASED YIELD BY POTASH WHEN ADDED TO SUPERPHOSPHATE. 36¹ YEARS, 1876-1911.

Series.	Nitrogenous Manure.	With Superphosphate. Plot 5.	With Superphosphate and Potash. Plot 6.
		tons.	tons.
O	No Nitrogen	5·01	4·39
N	Nitrate of Soda	15·21	15·52
A	Ammonium-salts	7·16	14·19
AC	Ammonium-salts and Rape-cake .	9·71	23·39
C	Rape-cake	10·83	19·28

¹ 33 years only, omitting 1885, 1901, when the cross-dressings of nitrogen were not applied, and 1908, when mangolds failed and swedes were substituted.

the work of the potash which the plant requires; it may to a certain extent effect an economy and enable the plant to get on with a minimum of potash, but the chief action of the nitrate of soda is to attack the insoluble compounds of potash in the soil and bring their potash into solution. We can show in the laboratory that such a chemical action will take place, that when clay is shaken up with a weak solution of nitrate of soda some potash will come into solution, its place in the insoluble clay being taken by an equivalent amount of soda, and the results set out in Table X. for the wheat on Broadbalk field show how other compounds of soda may have the same effect. Plot 13 receives ammonium-salts, superphosphate, and sulphate of potash; plot 12 the same ammonium-salts and superphosphate, but sulphate of soda instead of potash. As the results show, for many years these two plots gave practically the same crop. It is only lately, when the original stock of potash in the soil upon which the sulphate of soda had been working has become to a certain extent exhausted, that the yield with sulphate of soda instead of sulphate of potash has begun to fall off. That the action of the soda does supply the plant with potash is confirmed by analyses of the ash grown upon the two plots. The wheat on plot 12 contains no more soda than that upon plot 13, but it contains almost an equal amount of potash, far more than is contained in the ash of plot 11, to which neither potash nor soda are supplied.

An examination of the results yielded by the mangold plots

illustrates very clearly one of the functions of potash in the nutrition of a plant. If we take a year of good growth—*e.g.*, 1900—and compare plots 5 and 6 A, which both receive the same amount of nitrogen as ammonium-salts and an equal amount of phosphoric acid but sulphate of potash only upon 6, we see (Table XV.) that the plant on both plots developed its

TABLE XV.—MANGOLDS, BARNFIELD. SEASON 1900. EFFECT OF POTASH ON YIELD OF DRY MATTER AND SUGAR.

Plot.	Manures.	Produce per acre.		In Roots, per acre.	
		Roots.	Leaves.	Dry Matter.	Sugar.
		tons.	tons.	tons.	tons.
5 A	{ Ammonium - salts, Superphosphate	12·00	2·95	1·18	0·797
6 A	{ Ammonium - salts, Superphosphate, Sulphate of Potash	28·20	3·60	2·39	2·471

leaves freely, the weight of leaf upon 6 being not very much larger than that upon 5. The amount of dry matter in the root, however, on 6 was more than double that on 5, and the analyses of the roots show that the comparative amounts of sugar per acre differed even more greatly, being three times as great where potash was applied. Now the formation of sugar and other dry matter of the root has to be carried out by the leaf, and as the leaves were almost as well developed on 5 as on 6, and were exposed to exactly the same conditions of atmosphere, light, water-supply, &c., we can only conclude that the plant on 5 lacked something that was essential to the mechanism by means of which the plant transforms the carbon dioxide of the atmosphere into such materials as sugar, starch, cellulose, and the other carbohydrates that go to make about nine-tenths of the dry matter of the plant. Hence the importance of an abundant supply of available potash for such crops as manufacture large quantities of carbohydrates—*e.g.*, mangolds, sugar beet, potatoes, &c.

One other class of crops is also very dependent upon potash, though they are not plants which store a large proportion of carbohydrate—namely, those belonging to the order of Leguminosæ—clover, beans, peas, lucerne, vetches, &c. Owing to the impossibility of growing leguminous crops continuously upon the same land, their dependence upon potash-salts may best be illustrated from the plots of grass land which are cut for hay every year. This experiment began

in 1856, when a piece of old grass land in the Park was divided into plots, each of which have received a different manurial treatment, repeated without change on the same plot ever year since. Under such differential treatment it is well known that the botanical character of the herbage will begin to change. Owing to the competition between the various species making up the herbage on an ordinary grass field, those particular plants which receive the benefit from the treatment adopted will get an advantage over their fellows, and tend to become dominant by pushing out the other less favoured species, until in the course of time the whole character of the flora can be altered in response to differences in manurial treatment. Table XVI. shows the yield and the botanical composition of

TABLE XVI.—THE PARK, ROTHAMSTED. AVERAGE YIELD OF HAY AND BOTANICAL COMPOSITION OF FIRST CROP. 10 YEARS, 1902-11.

Plot.	Manures.	Produce per acre (1st and 2nd crop).	Mean Botanical Composition, 1st crops.		
			Gra- mineæ.	Legu- minosæ.	Other Orders.
		cwt.	per cent.	per cent.	per cent.
3	Unmanured	16·4	49·9	7·8	42·3
4-1	Superphosphate	21·2	51·3	9·7	39·0
7	Complete Mineral Manure	51·6	52·0	25·9	22·1
9	Complete Mineral Manure and Ammonium-salts	56·6	193·6	10·6	15·8

¹ Mean of 1902 and 1903 only.

four of the plots on this field for the last ten years,—the unmanured plot, 3; that which receives superphosphate only, 4-1; that which receives phosphates and potash only without nitrogen, 7; and that which receives the same phosphates and potash, but, in addition, a comparatively large amount of nitrogen in the shape of ammonium-salts, 9. Without manure the grass is not only reduced in amount to a very low ebb, but the impoverished character of the herbage is also seen in the varied number of species and the predominance of weeds. Even among the grasses, varieties that are characteristic of poor land become prominent: for example, the common Quaking Grass (*Briza media*), a grass usually regarded as a sign of poor land, has come to constitute 20 per cent of the whole herbage, although it does not occur on any of the manured plots. Where superphosphate and nothing else is supplied there was a considerable increase of crop for the first year or two

because the superphosphate helped the plant to draw upon the stores of nitrogen and potash in the soil. But this effect soon passed away, and the land is now if anything more impoverished than on the unmanured plot. It should be noted that superphosphate alone is not sufficient to bring about any increased development of the leguminous crops, and this is a matter of some importance in view of the use of basic slag only as a manure for grass land. It is well known that on heavy soils basic slag generally results in a vastly increased growth of clover and a general improvement both in the yield and character of the herbage. To bring about this effect not only the phosphoric acid of the basic slag takes part, but also the lime, which attacks the potash compounds locked up in the soil, and liberates potash for the benefit of the clover. There comes a time, however, when the potash for this purpose is no longer available, and repetitions of the dressings of basic slag begin to be less effective; then it is necessary to supply the land with some potash-salts as well as basic slag if the improvement in the herbage and the predominance of clover is to be maintained.

To return to the Rothamsted plots, No. 7 has received a complete mineral manure since the beginning of the experiment, and it will be seen that the herbage now contains a very large proportion, rising to one-half in favourable seasons, of leguminous plants. Not only is there this large proportion of clovers, but the production upon this plot is very considerable, amounting to 51 cwt. of hay per acre per annum. This involves the growth of more than three times as much grass alone (after deducting the leguminous plants and the weeds) as on the unmanured plot,—more grass even than is produced by some of the other plots which receive nitrogen in their fertiliser. Such a large amount of grass must take out of the soil a good deal of nitrogen, the whole of which has to be derived from the residues of the previous growth of the leguminous plants which have taken the nitrogen from the air. Actually from this plot something like 65 lb. of nitrogen per acre are removed annually, wholly derived from the atmosphere, and this has only been made possible by the addition of potash to the phosphates, for as plot 4-1 shows, phosphates alone have no permanent effect upon the leguminous herbage. Lastly, plot 9, with a large amount of nitrogen in addition to the mineral manures, produces an almost exclusively grassy herbage. When nitrogen is abundant the grasses are able to develop and crowd out the leguminous plants; the large yield in this case derives the whole of its nitrogen from the fertilisers and none from the atmosphere.

The Rothamsted grass plots illustrate very clearly how liberal

applications of potash and phosphates make for the permanent improvement of grass land, and can render it capable of growing large crops of good quality without any extraneous supply of nitrogen at all.

Certain other functions of potash are also illustrated by the grass plots where potash is lacking, particularly where large amounts of nitrogen are also supplied. The herbage is always very weak, and though its actual weight may not be great, it is so soft as to be always laid by heavy rains long before it is ready to cut. This weakness of the straw is owing to deficient carbohydrate formation in the absence of potash, and it may also be seen with wheat and barley both in the field and again in the threshing machine, where the straw grown without potash is always very brittle. Again, the grass on the potash-starved plots is always subject to fungoid disease; the tips of the leaves are generally brown with rust, and towards the end of June the plots are marked by a very large number of flower heads which are white and seedless, because before the seed can fill the access of nutriment is cut off by the attack of a fungus at the base of the stem. Similarly the mangolds on the plots lacking potash are in most seasons attacked by a leaf-spot fungus (*Uromyces betae*), until in October the whole of the foliage appears brown and seared up; and, again, the wheat on the plots lacking potash is always specially subject to rust. We may take it, in fact, as a general conclusion, that plants short of potash will be specially liable to attacks of fungoid diseases.

Turning now to Tables XII. and XIII., we may gain from them some idea of the behaviour of potash fertilisers with regard to seasons, and we find that the conclusions reached concerning phosphoric acid are practically reversed for potash—that is to say, potash has its maximum effect in dry seasons instead of in wet. For example, in the wet season an application of potash only increased the wheat from 11 bushels on plot 11 to 16 on plot 13, but in the dry season of 1893 it increased it from 7·7 to 16·4 bushels. In the same dry season the potash increased the production of barley from 18·1 bushels on plot 2 to 30·8 bushels on plot 4, whereas in the wet season of 1894 the increase was only 6·5 bushels. Applications of potash tend to keep the plant growing, probably in consequence of its intimate association with the process of assimilation. This fact may have something to do with the marked response of crops upon light dry soils to potash. Not only do these soils contain less potash than clays, but by their dryness they induce the crop to shoot up prematurely to flowering and seed production, whereas the potash works in a contrary direction and tends to continue the vegetative activity. The effect of potash,

however, in prolonging the growth, and therefore in bringing about a high yield, may not always be commercially beneficial. For example, cases have been noted by growers, both of early potatoes and of early peas upon light dry soils, where the use of potash has largely increased the yield, but has made it just so much later as to miss the high prices which first of all prevail in the market. Here the continued vegetative development of the plant which was brought about by the potash, though it resulted both in better health and a larger yield, was economically a disadvantage, so much more commercially valuable may earliness be than gross yield.

The above discussions constitute a few examples of the light which the original field trials at Rothamsted still continue to throw on current agricultural practice; ¹ in a later paper I hope to be able to set out the conclusions which may be derived from some of the new investigations that have been carried out in recent years.

A. D. HALL.

THE FOOD OF BIRDS.

By LAURA FLORENCE, M.A., B.Sc., Carnegie Scholar in the University of Aberdeen.

THE majority of the 616 birds examined for the purpose of this investigation were shot while feeding on agricultural land. The specimens were obtained chiefly in the North-Eastern counties of Scotland, although a small number sent from the Southern counties and England have been included. No field observations have been made as yet, but it is intended to follow out this branch of the inquiry during the summer of 1911.

As it is only a year since this work was begun, it is too early to draw any definite conclusions or to state the proportions of the different kinds of food preferred by the various birds. In many cases the remains of insects were so fragmentary that it was impossible to count them or to identify the species. It seems, however, fairly evident that

¹ Complete tables giving the yield from all the plots, with full details of the manuring, can be found in the 'Book of the Rothamsted Experiments,' Murray, 1905; the Annual Report distributed free from the Rothamsted Experimental Station, Harpenden, contains the figures for the preceding year.

the insects and larvæ which are harmful to agriculture predominated. *E.g.*—

Amongst the Coleoptera, weevils were most frequent; amongst the Diptera, daddy-longlegs and their larvæ. Examinations made during August revealed the presence of the eggs of Tipulidæ in all parts of the alimentary canal in very large numbers—in some cases thousands. Microscopic observation showed no outward difference between eggs found in the stomach, in the small intestine, and in the cloaca.

The problem that remains to be solved next August is whether the eggs from any or all parts of the canal will hatch if preserved in damp earth. The question of how and where the birds get the eggs also arises. Their small size makes it seem improbable that they are picked from the ground. It is more likely that they are liberated in the bird's stomach, either by being extruded by the insect before death, or by the digestion of the surrounding tissues after death.

In estimating the true nature of the food, a careful distinction must be made between the material the bird seeks and extraneous matter which may adhere thereto. For example, in a heron several portions of the inflorescence of a grass were found, no doubt swallowed adhering to its prey. In many birds, whose food consisted chiefly of earthworms and ground larvæ, small pieces of moss and single seeds were found.

Another point in connection with this subject, to which little attention has been given in this country, is the cultivation in agricultural districts of plants and shrubs to provide food for birds throughout the year, and so help to prevent their feeding on the crops. This method, which has been adopted in some parts of the United States of America, is described by Mr W. L. M'Attee in his paper, "Plants Useful to Attract Birds and Protect Fruit."¹

During a week of severe frost in February (1910) a number of starlings were examined, and in almost every case the food consisted of corn, seeds, and fruits of weeds and wild plants. All the seeds, with the exception of the corn, were found in every part of the intestine in perfect condition, consequently providing no sustenance for the birds, who were thus acting as distributors of the seeds. In the same week twenty-five chaffinches were examined, the food in their case consisting almost entirely of seeds of spurrey, chickweed, and charlock, with a very little grain. No trace of these seeds was found in the intestine. Seventeen yellow-hammers were examined, and their food consisted entirely of corn. It was all digested.

In every case the method of examination has been the same. The alimentary canal was removed entire from the bird and

¹ 'Year-Book of the Department of Agriculture,' 1909 (United States).

then severed at the junction of the stomach with the duodenum. The stomach was afterwards carefully opened with fine scissors, and the contents washed into a dish. The larger objects were picked out and identified, while the remainder was repeatedly washed to remove all earth before being submitted to microscopic examination. The intestine was then opened, and the contents treated in the same way.

In the summaries at the end of each species, the classification of the insects is copied from that of Mr Newstead in his paper on "The Food of some British Birds."¹

Thanks are due to Professor J. Arthur Thomson and to Professor J. W. H. Trail for much kind assistance, advice, and encouragement; and to Major Watson for assistance in the identification of Coleoptera. The research has been carried on during my tenure of a Carnegie Scholarship.

MISTLE THRUSH (*Turdus viscivorus*, Linn.).

1. Female; Mintlaw, Aberdeenshire; 8th December 1909; stomach practically filled with fruits, remains of fruits, and seeds of wild rose (*Rosa*, probably *Glauca*).
2. Female; Aberdeen; 31st December 1909; stomach packed with skins of fruits, fruits, and seeds of wild rose (*Rosa* sp.); 2 holly seeds (*Ilex aquifolium*).
3. Male; Elgin, Morayshire; 3rd March 1910; stomach almost empty: remains of a fleshy fruit; 1 seed (*Compositæ*); sand.

In the intestines of the first two birds there were a large number of the seeds of the rose, and in the second also a holly seed. These showed no trace of any action of the digestive juices, and seem, therefore, to illustrate a means of their distribution.

Summary:—2 contained fruits of the wild rose; 1, holly seeds; 1, seed of *Compositæ*.

SONG THRUSH (*Turdus musicus*, Linn.).

1. Male; Banchory, Aberdeenshire; 11th April 1910; stomach three-quarters full: remains of 2 much-digested caterpillars; fragments of a few beetles; remains of 21 wire-worms; 8 fruits of the birch (*Betula* sp.); sand.
2. Female; Cluny, Aberdeenshire; 16th July 1910; stomach quite empty.
3. Male; Cluny, Aberdeenshire; 16th July 1910; stomach full: remains of several earth-worms; 1 wire-worm; 1 centipede (*Geophilus* sp.); weevils, one complete and remains of several (*Otiorrhynchus picipes*); forceps of an earwig; remains of 3 Dipterous larvæ; earth.
4. Female; Cluny, Aberdeenshire; 16th July 1910; stomach almost empty: a few fragments of a strawberry.
5. Male; Cluny, Aberdeenshire; 16th July 1910; stomach almost empty: a few pieces of grass; abdomen of a beetle; 2 seeds, probably clover (*Trifolium* sp.), very much digested.

¹ Supplement to the 'Journal of Board of Agriculture,' vol. xv., No. 9, December 1908.

6. Male; Inverurie, Aberdeenshire; 26th July 1910; stomach half full: remains of earth-worms; 1 beetle (*Calathus melanocephalus*); body of 1 weevil (*Otiorrhynchus* sp.); 1 mite (*Opilio* sp.); 1 achene of a strawberry; sand.

Summary.—2 contained larvæ; 2, insects of injurious group; 1, beneficial group; 2, remains of beetles; 2, earth-worms; 1, centipede; 1, mite; 1, earwig; 2, seeds; 2, strawberry; 1, grass.

REDWING THRUSH (*Turdus iliacus*, Linn.).

1. Male; Salen, Loch Sunart, Argyleshire; 21st January 1910; stomach almost empty: 3 univalve molluscs, fragments only (?); 6 bivalve molluscs (*Sphærium lacustre*); 1 Dipterous larva.
2. Male; Raeden, Aberdeen; 5th February 1910; stomach almost empty; 3 holly seeds (*Ilex aquifolium*).
3. Male; Raeden, Aberdeen; 5th February 1910; stomach quite empty.
4. Female; Raeden, Aberdeen; 5th February 1910; stomach almost empty: 1 holly seed (*Ilex aquifolium*).
5. Male; Elgin, Morayshire; 3rd March 1910; stomach full: remains of earth-worms; remains of 1 grey slug (*Limax* sp.); 1 complete caterpillar (*Leucania* sp.) and skins of 2; 3 beetles (1 *Aphodius scybalarius*, 2 *Philonthus laminatus*); several larvæ of ground beetles; 1 Dipterous larva; skin of a Coleopterous larva.
6. Male; Elgin, Morayshire; 3rd March 1910; stomach full: 2 whole earth-worms and remains of several; 7 larvæ (4 leather jackets (*Tipula* sp.), 1 Dipterous larva, 1 larva of a Muscid fly, skin of a Lepidopterous larva); some withered grass.
7. Female; Corstorphine, Mid-Lothian; 8th March 1910; stomach quite empty.
8. Sex (?); Nottingham; 16th March 1910; stomach almost empty: remains of several larvæ (*Coleoptera*).
9. Male; Loirston, Kincardineshire; 21st November 1910; stomach almost three-quarters full: remains of 1 large snail (*Helix* sp.); remains of 2 small snails (*Clausilia* sp.); 7 forceps of earwigs (3½ pairs); elytra of 4 beetles; moss.

Summary.—3 contained molluscs; 4, larvæ; 1, remains of beetles; 1, insects of injurious group; 2, earth-worms; 2, holly seeds.

FIELDFARE (*Turdus pilaris*, Linn.).

1. Female; Fyvie, Aberdeenshire; 5th April 1910; stomach full: remains of earth-worms; 9 leather jackets (larvæ of *Tipula* sp.); 1 wire-worm; 1 beetle (*Notiophilus biguttatus*); 9 weevils (5 whole and remains of 3 *Sitones tibialis*, 1 *Otiorrhynchus picipes*); 1 seed (*Gramineæ*, *Bromus* sp.); 3 heads of rushes (*Juncus* sp.); grass.
2. Female; Cluny, Aberdeenshire; 12th July 1910; stomach empty: fragment of a leaf.

Summary.—1 contained insects of the injurious group.

BLACKBIRD (*Turdus merula*, Linn.).

1. Male; Brucklay, Aberdeenshire; 12th November 1909; corn; seeds (*Rosaceæ*, *Rubææ*); sand grains.
2. Female; Brucklay, Aberdeenshire; 12th November 1909; corn; seeds (*Boraginaceæ*); sand; a few small pebbles.

3. Male ; New Cumnock, Ayrshire ; 11th December 1909 ; corn ; maize (1 whole grain and remains of others) ; grass ; sand and a few small pebbles.
4. Female ; New Cumnock, Ayrshire ; 11th December 1909 ; corn (remains of grains only) ; seed of hawthorn (*Crataegus* sp.) ; sand.
5. Female ; Clatt, Aberdeenshire ; 12th January 1910 ; husks of corn ; grass ; 1 insect (*Tipulidæ*, *Trichocera hiemalis*) ; 1 leather jacket (*Tipulidæ*, *Tipula* sp.) ; disorganised vegetable remains ; fine mud.
6. Male ; Aboyne, Aberdeenshire ; 24th January 1910 ; larvæ—(a) 11 leather jackets (*Tipulidæ*, *Tipula* sp.), (b) 5 Dipterous larvæ ; large quantity of husks of corn grains ; a few fragments of corn grains ; fragments of beetles (too small for identification) ; remains of 2 caterpillars ; grass.
7. Female ; Aboyne, Aberdeenshire ; 26th January 1910 ; stomach full : fragments and husks of corn grains ; a few pieces of grass and remains of leaves ; sand ; small stones.
8. Male ; Aboyne, Aberdeenshire ; 27th January 1910 ; stomach empty : a few husks of corn ; disorganised vegetable remains ; a few small pebbles.
9. Female ; Mintlaw, Aberdeenshire ; 27th January 1910 ; stomach very full : 21 whole corn grains ; bulk of content was husks and fragments of corn grains ; seeds—(a) 2 ragwort (*Senecio Jacobææ*), (b) 1 chickweed (*Stellaria media*), (c) 2 spurrey (*Spergula arvensis*) ; remains of skin of a caterpillar ; 3 stones.
10. Male ; Mintlaw, Aberdeenshire ; 27th January 1910 ; stomach three-quarters full : practically whole content husks and fragments of corn ; 3 whole corn grains ; a spurrey seed (*Spergula arvensis*, var. *sativa*) ; 2 stones.
11. Male ; Aboyne, Aberdeenshire ; 7th February 1910 ; stomach full : husks and fragments of fresh corn grains ; some fragments of Indian corn ; sand ; stones.
12. Male ; Brucklay, Aberdeenshire ; 8th February 1910 ; stomach full : filled with husks of corn grains ; 18 grains of fresh corn ; sand ; stones. In the intestine two whole corn grains.
13. Male ; Elgin, Morayshire ; 3rd March 1910 ; stomach half full : land snail (*Zonites nitidulus*) ; remains of 1 weevil (*Otiorrhynchus atroapterus*) ; remains of 3 spiders ; 3 Dipterous larvæ ; husks of grain.
14. Male ; Elgin, Morayshire ; 3rd March 1910 ; stomach partly shot away : a few husks of grain ; a few pieces of grass ; earth.
15. Male ; Elgin, Morayshire ; 3rd March 1910 ; stomach full : fragments and husks of corn grains ; remains of larvæ of beetles (*Carabidæ*) ; 1 beetle (*Staphylinidæ*, *Stenus similis*) ; 2 holly seeds (*Ilex aquifolium*) ; sand ; stones.
16. Nestling ; Aberdeen, Aberdeenshire ; 7th June 1910 ; stomach half full : grass ; small fragments of twigs ; sand.
17. Female ; Lynturk, Aberdeenshire ; 14th July 1910 ; stomach full : corn husks ; small pieces of grass ; remains of beetles—1 head (*Carabidæ*), 2 abdomens (?) ; 2 weevils (*Otiorrhynchus picipes*) ; remains of larvæ of ground beetles ; sand.
18. Female ; Cluny, Aberdeenshire ; 15th July 1910 ; stomach full : filled with remains of strawberries and gooseberries in almost equal proportion ; stones.
19. Female ; Longside, Aberdeenshire ; 15th July 1910 ; stomach three-quarters full : remains of strawberries and gooseberries in almost equal proportion.
20. Male ; Longside, Aberdeenshire ; 15th July 1910 ; stomach full : remains of strawberries and gooseberries ; a few small pieces of grass ; abdomens of 2 beetles ; stones.

21. Female ; Cluny, Aberdeenshire ; 15th July 1910 ; stomach half full : a few husks of grain ; egg of daddy-longlegs (*Tipula* sp.) ; wings of a beetle ; head of 1 beetle (*Xantholinus*) ; skin of a caterpillar ; tail of a wire-worm ; sand.
22. Female ; Cluny, Aberdeenshire ; 20th July 1910 ; stomach half full : filled chiefly with the remains of gooseberries ; fragments of grain husks ; 2 seeds of the currant (*Ribes* sp.) ; sand.
23. Female ; Culter, Aberdeenshire ; 29th July 1910 ; stomach almost empty : a few fragments of gooseberry ; a few achenes of a strawberry ; some pieces of withered grass ; some fragments of chitin ; 1 stone.
24. Female ; Culter, Aberdeenshire ; 3rd August 1910 ; stomach full : remains of gooseberries and of strawberries ; seeds. In the intestine there was a large number of seeds, all quite whole.
25. Female ; Culter, Aberdeenshire ; 3rd August 1910 ; stomach full : remains of gooseberries ; remains of 1 centipede (?) ; remains of a beetle (*Staphylinidæ*) ; 1 raspberry seed (*Rubus idæus*) ; stones ; earth. In the intestine a large number of whole gooseberry seeds.
26. Male ; Culter, Aberdeenshire ; 4th August 1910 ; stomach full : practically filled with pieces of strawberries ; a few fragments of gooseberries ; 1 weevil (*Hypera*, probably *polygona*) ; 2 beetles (*Silpha nigrata*, *Anthophagus testaceus*) ; stones.
27. Male ; Culter, Aberdeenshire ; 4th August 1910 ; stomach half full : chiefly remains of gooseberries ; a few pieces of strawberry. In the intestine whole gooseberry seeds.
28. Female ; Culter, Aberdeenshire ; 20th October 1910 ; stomach full : seeds (dock—*Rumex acetosella*, hemp-nettle—*Gleopsis*) ; bulk of content was remains of fleshy fruits and achenes of the wild rose (*Rosa*) ; remains of weevil ; sand. In the intestine a number of uninjured seeds similar to those in the stomach. Also remains of insects.
29. Male ; Culter, Aberdeenshire ; 20th October 1910 ; stomach half full : remains of earth-worms ; 3 small pieces of grass ; sand ; small stones.

Summary.—18 contained grain ; 10, seeds of wild plants ; 9, fragments of gooseberries and strawberries ; 9, grass ; 1, Indian corn ; 7, larvæ ; 1, insects of beneficial group ; 5, indifferent group ; 4, injurious group ; 5, remains of insects ; 1, insect eggs ; 1, centipede ; 1, spiders ; 1, snails ; 1, earth-worms.

WHEATEAR (*Saxicola ænanthe*, Linn.).

1. Male ; Lynturk, Alford, Aberdeenshire ; 1st June 1910 ; crop : remains of 2 insects ; stomach about half full : remains of insects—I. (*Diptera*, (a) *Muscidæ*, *Calliphora* sp.), (b) *Tipulidæ*, *Tipula* sp.) ; II. (*Hymenoptera*) ; III. (*Coleoptera*, abdomen of beetle).

REDBREAST (*Erithacus rubecula*, Linn.).

1. Male ; Aboyne, Aberdeenshire ; 28th January 1910 ; stomach almost empty : a few husks of grain ; 1 seed peony (*Ranunculaceæ*, *Pænia*) ; sand.
2. Male ; Elgin, Morayshire ; 3rd March 1910 ; stomach full : practically filled with corn ; 1 whole grain and fragments of grains ; small stones.

Summary.—2 contained grain ; 1, seed of garden plant.

HEDGE SPARROW (*Accentor modularis*, Linn.).

1. Male; New Cumnock, Ayrshire; 8th December 1910; stomach full: 6 grains of corn; seeds (*Polygonum* sp., *Trifolium* sp., *Carex* sp.); legs and wings of several beetles.
2. Male; Aboyne, Aberdeenshire; 22nd January 1910; stomach almost empty: part of 1 corn grain and a few husks; seeds—1 birch fruit (*Betula* sp.), 4 clover seeds (*Trifolium* sp.).
3. Female; Aboyne, Aberdeenshire; 31st January 1910; stomach about half full: seeds (7 *Polygonum* sp.), 5 dock (*Rumex* sp.); sand.
4. Male; Mintlaw, Aberdeenshire; 31st January 1910; stomach almost completely filled with sand and small stones; a few fragments of corn grains and husks; a few seeds (a) chickweed (*Stellaria media*), (b) (*Polygonum* sp.).
5. Male; Mintlaw, Aberdeenshire; 31st January 1910; stomach full: seeds (a) 1 persicaria (*Polygonum Persicaria*), (b) 175 chickweed (*Stellaria media*); some fragments and husks of corn; sand.
6. Male; Elgin, Morayshire; 2nd March 1910; stomach full: many seeds (a) chickweed (*Stellaria media*), (b) (*Chenopodiaceæ*, *Atriplex* or *Chenopodium*), (c) sheep-sorrel (*Rumex acetosella*), (d) (*Polygonum* sp.), (e) holly (*Ilex aquifolium*); fragments of corn grains.
7. Male; Elgin, Morayshire; 2nd March 1910; stomach full: seeds (a) 10 medick (*Medicago sativa*); 1 knot-grass (*Polygonum aviculare*); a few fragments of corn; abdomen of 1 beetle.

Summary.—2 contained fragments of insects; 7, seeds.

In all cases the seeds were digested by the birds, as no traces of seeds were found in the intestine.

LONG-TAILED TITMOUSE (*Acredula caudata*, Linn.).

1. Male; Nottingham; 18th January 1910; stomach almost full: 1 weevil (*Orchestes alni*); fragments of insects (*Coleoptera*); cocoon (*Hymenoptera*); larva (*Coleoptera*); remains of a spider; remains of a few seeds; small stones.

Summary.—Contained insects of injurious group; spider.

GREAT TITMOUSE (*Parus major*, Linn.).

1. Male; Nottingham; 18th January 1910; stomach about a quarter full: fragments of insects (*Coleoptera*); tiny fragments of vegetable matter.
2. Female; Northumberland; 19th January 1910; stomach full: fragments of insects (*Coleoptera*); husks and fragments of corn grains.
3. Male; Elgin, Morayshire; 3rd March 1910; stomach full: filled with corn; sand.

Summary.—2 contained remains of beetles; 2, corn.

COAL TITMOUSE (*Parus ater*, Linn.).

1. Male; Salen, Loch Sunart, Argyleshire; 10th January 1910; stomach not quite full: skins of three Dipterous larvæ; remains of insects (*Coleoptera*).
2. Female; Aboyne, Aberdeenshire; 4th February 1910; stomach half full: skin of a larva (*Diptera*); pupæ of a fly (*Diptera*).

BLUE TITMOUSE (*Parus cæruleus*, Linn.).

1. Male; Loch Sunart, Argyleshire; 6th January 1910; stomach about a quarter full: seeds—central parts of fruits of Birch (*Betula* sp.); fragments of wheat grains; fragments of chitin; sand.
2. Female; Loch Sunart, Argyleshire; 8th January 1910; stomach full: packed with fruits of birch (*Betula* sp.); leg of an insect.
3. Male; Clatt, Aberdeenshire; 12th January 1910; stomach injured by shot: fragments of chitin; a few small pieces of grass.
4. Male; Nottingham; 19th January 1910; stomach almost empty: fragments of corn grains and of husks of grain.
5. Sex?; Mintlaw, Aberdeenshire; 31st January 1910; stomach full: 5 Dipterous larvæ; husks and fragments of corn grains; sand.
6. Male; Elgin, Morayshire; 3rd March 1910; stomach full: filled with tiny fragments of vegetable matter.
7. Male; Nottingham; 3rd March 1910; stomach full: filled with tiny fragments of vegetable matter.
8. Male; Cults, Aberdeenshire; 26th May 1910; stomach quite empty.

Summary.—3 contained grain; 2, seeds; 2, vegetable matter; 1, grass; 1, larvæ; 3, remains of insects.

PIED WAGTAIL (*Motacilla lugubris*, Temminck).

1. Male; Kennethmont, Aberdeenshire; 28th March 1910; stomach almost empty: a very small quantity of disorganised insect remains.

GREENFINCH (*Ligurinus chloris*, Linn.).

1. Male; Aberdeen; 14th December 1909; stomach almost empty: fragments of a few seed coats; stones.
2. Male; Clatt, Aberdeenshire; 26th January 1910; stomach half full: fragments of corn grains and 5 whole grains; stones.
3. Male; Aboyne, Aberdeenshire; 27th January 1910; stomach three-quarters full: husks and fragments of corn grains; stones.
4. Female; Aboyne, Aberdeenshire; 27th January 1910; stomach three-quarters full: husks and fragments of corn grains; stones.
5. Male; Mintlaw, Aberdeenshire; 27th January 1910; stomach about quarter full: a few husks and fragments of corn grains; stones.
6. Female; Mintlaw, Aberdeenshire; 27th January 1910; stomach full: husks and fragments of corn grains, and 8 whole grains; stones.
7. Male; Mintlaw, Aberdeenshire; 27th January 1910; stomach full: husks and fragments of grain, and 6 whole grains; stones.
8. Female; Kennethmont, Aberdeenshire; 2nd March 1910; stomach full: fragments and husks of corn grains; stones.
9. Male; Nottingham; 3rd March 1910; stomach three-quarters full: bulk of content, small stones; a few fragments of corn grains.
10. Male; Alford, Aberdeenshire; 30th July 1910; crop full: seeds—374 chickweed (*Stellaria media*), 1 charlock (*Brassica sinapistrum*), 43 dock (*Rumex* sp.); 32 young plants; remains of 1 corn grain; stomach filled with seeds of chickweed (*Stellaria media*); a few dock seeds (*Rumex* sp.); fragments of a few corn grains; sand.
11. Sex (?); Culter, Aberdeenshire; 15th August 1910; stomach full: remains of corn grains; seeds, mouse-ear chickweed (*Cerastium triviale*); stones.

Summary.—11 contained corn; 2, seeds of weeds.

HAWFINCH (*Coccothraustes vulgaris*, Pallas).

1. Male ; Hastings, Kent ; 7th July 1910 ; stomach full : 1 cocoon (probably *Hymenoptera*) ; fragments of broken-up tissue, probably from a woody fruit ; stones.
2. Female ; Hastings, Kent ; 7th July 1910 ; stomach full : fragments of sclerenchyma, possibly of endocarp of *Prunus* ; some fragments, probably organic.

Summary :—1 contained a cocoon ; 2, fragments of fruits.

HOUSE SPARROW (*Passer domesticus*, Linn.).

1. Sex (?) Brucklay, Aberdeenshire ; 12th November 1909 ; crop full : corn ; stomach full : fragments of corn grains ; stones.
2. Male ; Brucklay, Aberdeenshire ; 12th November 1909 ; crop full : corn ; fragments of green vegetable matter (?) ; stomach full : fragments of corn grains.
3. Female ; Girdleness, Kincardineshire ; 12th November 1909 ; stomach full : decomposed vegetable matter (?) ; stones.
4. Male ; Brucklay, Aberdeenshire ; 12th November 1909 ; stomach full : corn ; stones.
5. Male ; Brucklay, Aberdeenshire ; 12th November 1909 ; stomach full : corn ; stones.
6. Sex (?) Mintlaw, Aberdeenshire ; 14th December 1909 ; stomach empty.
7. Sex (?) Mintlaw, Aberdeenshire ; 14th December 1909 ; stomach empty.
8. Female ; Mintlaw, Aberdeenshire ; 12th January 1910 ; stomach about quarter full : fragments of husks and of grains of corn ; stones.
9. Male ; Mintlaw, Aberdeenshire ; 13th January 1910 : stomach almost empty : 1 corn grain ; stones.
10. Female ; Loirston, Kincardineshire ; 13th January 1910 ; stomach about three-quarters full : husks and fragments of corn grains ; stones.
11. Male ; Mintlaw, Aberdeenshire ; 15th January 1910 ; stomach almost empty : a few fragments of corn grains ; stones.
12. Female ; Mintlaw, Aberdeenshire ; 15th January 1910 ; stomach about half full ; husks and fragments of corn grains ; stones.
13. Female ; Mintlaw, Aberdeenshire ; 15th January 1910 ; stomach about half full : husks and fragments of corn grains ; stones ; cinders.
14. Female ; Mintlaw, Aberdeenshire ; 15th January 1910 ; stomach full : fragments and husks of corn grains ; 2 whole grains ; stones.
15. Male ; Mintlaw, Aberdeenshire ; 15th January 1910 ; stomach full : husks and fragments of corn grains ; 3 whole grains ; stones.
16. Male ; Nottingham ; 17th January 1910 ; crop full : 29 grains of corn ; seeds of plantain (*Plantago* sp.) ; stomach full : husks and fragments of corn grains ; 8 whole grains ; 4 seeds of plantain (*Plantago* sp.) ; stones.
17. Female ; Nottingham ; 16th January 1910 ; stomach about quarter full : husks and fragments of corn grains ; stones.
18. Female ; Nottingham ; 17th January 1910 ; stomach about half full ; husks and fragments of corn grains ; stones.
19. Female ; Mintlaw, Aberdeenshire ; 1st February 1910 ; crop : 17 grains of corn ; stomach about three-quarters full : husks and fragments of corn grains ; 6 whole grains ; stones.

20. Female ; Mintlaw, Aberdeenshire ; 1st February 1910 ; crop : 10 corn grains ; stomach half full : husks and fragments of corn grains ; 5 whole grains ; stones.
21. Male ; Mintlaw, Aberdeenshire ; 1st February 1910 ; crop : 41 corn grains ; stomach three-quarters full : husks and fragments of corn grains ; 5 whole grains ; stones.
22. Male ; Mintlaw, Aberdeenshire ; 1st February 1910 ; crop : 27 corn grains ; stomach full : husks and fragments of corn grains ; 4 whole grains ; stones.
23. Female ; Brucklay, Aberdeenshire ; 7th February 1910 ; crop : 6 corn grains ; stomach about half full : contents chiefly sand ; a few fragments of corn grains.
24. Female ; Brucklay, Aberdeenshire ; 7th February 1910 ; crop : 5 corn grains ; stomach about half full : contents chiefly sand and stones ; a few fragments of corn grains ; 2 whole grains.
25. Female ; Brucklay, Aberdeenshire ; 7th February 1910 ; crop : 16 corn grains ; stomach about half full : contents chiefly sand ; a few fragments of corn grains ; 2 whole grains.
26. Female ; Brucklay, Aberdeenshire ; 7th February 1910 ; crop : 12 corn grains ; stomach about three-quarters full : husks and fragments of corn grains ; 4 whole grains ; sand.
27. Female ; Brucklay, Aberdeenshire ; 7th February 1910 ; crop : 17 corn grains ; stomach about three-quarters full : contents chiefly sand ; a few fragments of corn grains ; 3 whole grains.
28. Female ; Elgin, Morayshire ; 2nd March 1910 ; stomach full : fragments of corn grains ; sand.
29. Male ; Elgin, Morayshire ; 2nd March 1910 ; stomach full : fragments of corn grains ; sand.
30. Male ; Nottingham ; 3rd March 1910 ; stomach full : crumbs of bread ; sand.
31. Male ; Aberdeen ; 11th April 1910 ; stomach empty.
32. Male ; Aberdeen ; 12th April 1910 ; stomach almost empty : a few pieces of coal.
33. Sex (?) ; nestling ; Aberdeen ; 24th June 1910 ; stomach about three-quarters full : fragmentary remains of an insect (*Orthoptera*) ; fragments of chitin ; decomposed vegetable matter ; a few small pieces of lime.
34. Male ; Lynturk, Aberdeenshire ; 26th July 1910 ; crop : 10 corn grains ; stomach full : fragments of corn grains ; 3 whole grains ; stones.
35. Male ; Maud, Aberdeenshire ; 15th November 1910 ; stomach about half full : a few fragments of corn grains ; stones.

Summary :—30 contained grain ; 1, seeds ; 1, bread ; 1, an insect.

CHAFFINCH (*Fringilla cælebs*, Linn.).

1. Female ; Brucklay, Aberdeenshire ; 12th November 1909 ; crop empty ; stomach full : corn ; 1 seed (*Polygonum* sp.) ; stones.
2. Male ; New Cumnock, Ayrshire ; 11th December 1909 ; crop empty ; stomach almost empty : abdomen of an insect ; a few fragments of chitin ; sand and stones.
3. Male ; Nottingham ; 19th January 1910 ; crop empty ; stomach about half full : husks and fragments of grain ; seeds—1 hemp seed --probably found near a house ; 1 *Persicaria* (*Polygonum Persicaria*) ; 2 sheep-sorrel (*Rumex acetosella*) ; fragments of chitin.
4. Male ; Aboyne, Aberdeenshire ; 26th January 1910 ; crop empty ; stomach almost empty ; a few fragments of husks and grains of corn ; a few fragments of Indian corn ; stones.

5. Male; Aboyne, Aberdeenshire; 25th January 1910; crop full: 15 grains of corn; stomach full: 2 whole corn grains; many husks and fragments of grains; seeds—5 dock (*Rumex* sp.), 2 achenes of buttercup (*Ranunculus* sp.); stones.
6. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop about one-third full: 1 corn grain; seeds—8 charlock (*Brassica sinapistrum*); stomach full: fragments and husks of corn grains; seeds—9 spurrey (*Spergula arvensis*); sand and stones.
7. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop empty; stomach full: fragments and husks of corn grains; seeds—6 chickweed (*Stellaria media*); sand and stones.
8. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop full: seeds—70 charlock (*Brassica sinapistrum*), 3 spurrey (*Spergula arvensis*); 1 corn grain; stomach about quarter full: a few husks and fragments of corn; seeds—6 charlock (*Brassica sinapistrum*), 6 spurrey (*Spergula arvensis*); sand and stones.
9. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop full: seeds—82 charlock (*Brassica sinapistrum*); 1 corn grain; stomach full: fragments and husks of corn; seeds—4 charlock (*Brassica sinapistrum*), 9 spurrey (*Spergula arvensis*), 8 chickweed (*Stellaria media*); stones.
10. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop very full: packed with seeds of charlock (*Brassica sinapistrum*); stomach full: husks and fragments of corn; seeds—7 charlock (*Brassica sinapistrum*), 3 spurrey (*Spergula arvensis*); stones.
11. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop: 6 half grains of corn; seeds—28 charlock (*Brassica sinapistrum*); stomach about half full; fragments and husks of corn; seeds—8 charlock (*Brassica sinapistrum*), 6 chickweed (*Stellaria media*); stones.
12. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop: 3 corn grains; seeds—5 charlock (*Brassica sinapistrum*); stomach full: 4 corn grains; fragments and husks of grain; seeds—19 chickweed (*Stellaria media*), 10 charlock (*Brassica sinapistrum*); stones.
13. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop: 16 corn grains; seeds—30 charlock (*Brassica sinapistrum*); stomach about half full: 4 whole corn grains; fragments and husks of grain; remains of charlock seeds; stones.
14. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop: 16 charlock seeds (*Brassica sinapistrum*); stomach full: fragments and husks of corn; seeds—33 charlock (*Brassica sinapistrum*); stones.
15. Male; Mintlaw, Aberdeenshire; 1st February 1910; crop: 3 corn grains; 12 charlock seeds (*Brassica sinapistrum*); stomach about one-third full: a few fragments and husks of corn; seeds—10 charlock (*Brassica sinapistrum*); remains of spurrey seeds; stones.
16. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 5 corn grains; 24 charlock seeds (*Brassica sinapistrum*); stomach about half full: a few fragments of corn grains; 6 whole and many fragments of charlock seeds (*Brassica sinapistrum*); stones.
17. Female; Mintlaw, Aberdeen; 2nd February 1910; crop: 5 corn grains; 15 charlock seeds (*Brassica sinapistrum*); stomach full: 3 whole and a few fragments of corn grains; seeds—15 charlock (*Brassica sinapistrum*), 16 chickweed (*Stellaria media*); stones.
18. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 41 charlock seeds (*Brassica sinapistrum*); stomach full: fragments of corn grains; 14 whole and remains of several charlock seeds (*Brassica sinapistrum*); stones.

19. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 7 corn grains; seeds—20 charlock (*Brassica sinapistrum*), 1 chickweed (*Stellaria media*); stomach full: 10 grains and many fragments of corn grains; remains of charlock seeds; stones.
20. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 7 grains of corn; 1 charlock seed (*Brassica sinapistrum*); stomach full: 3 whole and many fragments of corn grains; seeds—3 chickweed (*Stellaria media*); stones.
21. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop empty; stomach very empty: a few tiny fragments of corn grains; a few fragments of seed coats of spurrey (*Spergula arvensis*); sand and pebbles.
22. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop empty; stomach almost empty: a few fragments of husks and of grains of corn; 1 spurrey seed (*Spergula arvensis*); sand and pebbles.
23. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 17 charlock seeds (*Brassica sinapistrum*); 3 corn grains; stomach full: seeds—11 charlock seeds (*Brassica sinapistrum*) and many fragments of seeds; fragments and husks of corn grains; sand and pebbles.
24. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop empty; stomach about half full: 5 charlock seeds (*Brassica sinapistrum*); 6 whole corn grains and a few fragments of grains; sand and pebbles.
25. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 22 charlock seeds (*Brassica sinapistrum*); half a corn grain; stomach about half full: 10 whole charlock seeds (*Brassica sinapistrum*) and fragments of same; a few fragments of corn grains; sand and pebbles.
26. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: seeds—1 chickweed (*Stellaria media*), 5 charlock (*Brassica sinapistrum*); 7 corn grains; stomach about three-quarters full: 7 spurrey seeds (*Spergula arvensis*) and fragments of others; 2 whole corn grains and fragments of corn grains; sand and pebbles.
27. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: seeds—2 spurrey (*Spergula arvensis*), 6 charlock (*Brassica sinapistrum*), 17 chickweed (*Stellaria media*); 15 grains of corn; stomach full: seeds—1 chickweed (*Stellaria media*), 2 spurrey (*Spergula arvensis*); 3 whole and fragments of corn grains; sand and pebbles.
28. Female; Mintlaw, Aberdeenshire; 2nd February 1910; crop: 11 charlock seeds (*Brassica sinapistrum*); 6 corn grains; stomach very empty: a few fragments of corn grains; sand and pebbles.
29. Male; Brucklay, Aberdeenshire; 7th February 1910; crop: filled with broken corn grains; 1 chickweed seed (*Stellaria media*); stomach almost full; 3 spurrey seeds and fragments of many (*Spergula arvensis*); fragments of corn grains and husks; large quantity of sand and pebbles.
30. Female; Aboyne, Aberdeenshire; 7th February 1910; crop not very full: fragments of corn grains; stomach about half-full: a few fragments of corn grains; sand and small pebbles.
31. Male; Elgin, Morayshire; 2nd March 1910; crop: 4 whole and a few fragments of corn grains; stomach full: fragments of corn grains; sand and small pebbles.
32. Male; locality (?); 30th March 1910; stomach full: fragments of seeds; a few small stones.
33. Male; Lynturk, Alford, Aberdeenshire; 16th June 1910; crop empty; stomach three-quarters full: 1 seed (?); fragments of decomposed vegetable matter; a few small stones.

34. Male; Aberdeen, Aberdeenshire; 20th June 1910; crop empty; stomach full: decomposed vegetable remains, very like remains of young green leaves; 39 small stones.

Summary:—31 contained grain; 1, Indian corn; 30, seeds of weeds; 2, decomposed vegetable matter; 2, insect remains.

BULLFINCH (*Pyrrhula europæa*, Vieillot).

1. Male; Salen, Loch Sunart, Argyleshire; 10th January 1910; stomach full: filled with heads of rushes (*Juncaceæ*, *Luzula* sp.); stones.
2. Male; Elgin, Morayshire; 2nd March 1910; stomach full: filled with minute fragments of fresh green vegetable matter; small stones.

Summary:—1 contained rushes; 1, vegetable matter.

CROSSBILL (*Loxia curvirostra*, Linn.).

1. Female; Balmoral, Aberdeenshire; 14th December 1909; stomach almost empty: part of 1 seed of a conifer, Scotch fir or larch; small pieces of quartz.

CORN-BUNTING (*Emberiza miliaria*, Linn.).

1. Female; Fyvie, Aberdeenshire; 8th January 1910; stomach full: filled with corn, 11 whole grains and the remainder broken grains; 1 stone.
2. Female; Aboyne, Aberdeenshire; 26th January 1910; stomach quite empty.
3. Female; Elgin, Morayshire; 2nd March 1910; crop: 12 grains of corn; stomach full: filled with broken corn grains; a few stones.

Summary:—2 contained grain.

YELLOW BUNTING (*Emberiza citrinella*, Linn.).

1. Male; Aboyne, Aberdeenshire; 21st January 1910; stomach very full: fragments and husks of corn grains and 4 whole grains; stones.
2. Male; Aboyne, Aberdeenshire; 21st January 1910; crop: 9 grains of corn; stomach not quite full: husks and fragments of corn grains; 5 whole grains; stones.
3. Female; Clatt, Aberdeenshire; 29th January 1910; stomach about one-third full: husks and fragments of corn; 5 whole grains; stones.
4. Male; Clatt, Aberdeenshire; 29th January 1910; stomach about half full: husks and fragments of corn grains; 2 whole grains; stones.
5. Male; Mintlaw, Aberdeenshire; 29th January 1910; stomach full: husks and fragments of corn grains; 9 whole grains; stones.
6. Female; Mintlaw, Aberdeenshire; 29th January 1910; crop: 5 grains of corn; stomach full: husks and fragments of corn grains; 8 whole grains; stones.
7. Male; Mintlaw, Aberdeenshire; 29th January 1910; stomach full: husks and fragments of corn grains; 14 whole grains; stones.
8. Female; Mintlaw, Aberdeenshire; 29th January 1910; crop: 10 whole and 4 half grains of corn; stomach about three-quarters full: husks and fragments of corn grains; 10 whole grains; stones.

9. Male; Mintlaw, Aberdeenshire; 20th January 1910; crop: 2 grains of corn; stomach about half full: husks and fragments of corn; stones.
10. Female; Mintlaw, Aberdeenshire; 28th January 1910; crop: 4½ grains of corn; stomach full: husks and fragments of corn grains; 22 whole grains; stones.
11. Female; Mintlaw, Aberdeenshire; 29th January 1910; crop: 1 grain of corn; stomach almost empty: contents chiefly sand and stones; a few fragments of corn.
12. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 15 grains of corn; stomach full: husks and fragments of corn grains; 12 whole grains; stones.
13. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 19 grains of corn; stomach about half full: husks and fragments of corn grains; stones.
14. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 1 grain of corn; stomach about quarter full: a few husks and fragments of corn; 5 whole grains; stones.
15. Male; Mintlaw, Aberdeenshire; 31st January 1910; stomach almost empty: 4 grains of corn; stones.
16. Male; Mintlaw, Aberdeenshire; 31st January 1910; stomach almost empty: a few fragments of corn grains; stones.
17. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 3 grains of corn; stomach about half full: husks and fragments of corn and 4 whole grains; stones.
18. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 1 grain of corn; stomach full: fragments and husks of corn grains; 12 whole grains; stones.
19. Female; Mintlaw, Aberdeenshire; 31st January 1910; crop: 2 grains of corn; stomach about three-quarters full: husks and fragments of corn grains; 5 whole grains; stones.
20. Female; Elgin, Morayshire; 2nd March 1910; stomach full: fragments of corn grains; stones.
21. Male; Aberdeen; 16th July 1910; crop full: carpels of a grass (probably *Bromus*); stomach full: carpels of grass (probably *Bromus*); a few fragments of chitin; stones.

Summary:—20 contained corn; 1, carpels of grass; 1, insect remains.

STARLING (*Sturnus vulgaris*, Linn.).

1. Sex (?); Mintlaw, Aberdeenshire; 8th December 1909; stomach almost empty: husk of a corn grain; 1 larva (*Muscidae*).
2. Sex (?); Mintlaw, Aberdeenshire; 10th December 1909; stomach full: corn; green leaves (*Cerastium*, probably *triviale*); 10 spiders (*Nerienne bicolor*); remains of 8 caterpillars (*Agrotis* sp.); beetles (4 *Philonthus laminatus*, 1 *Notiophilus aquaticus*, 1 *Nebria brevicollis*, 1 *Tuchypus pallipes*); weevils (7 *Sitones tibialis*); 1 wire-worm; 7 whole larvæ and remains of 2 of ground beetles (*Carabidae*); remains of grey slugs (*Limax* sp.); grass.
3. Sex (?); Mintlaw, Aberdeenshire; 11th December 1909; stomach empty.
4. Sex (?); Aberdeen; 24th December 1909; stomach almost empty: a few grain husks.
5. Female; Aberdeenshire; 10th January 1910; stomach full: husks and fragments of corn grains; 4 whole grains; 1 whole and remains of 5 caterpillars (*Noctua*, *Mamestra* sp.); 1 spider (*Nerienne bicolor*); 1 beetle and remains of 2 (*Philonthus varius*); 3 weevils

- (*Sitones tibialis*) and remains of 2; 1 larva (*Muscidæ*) leather jackets (*Tipula* sp.); remains of 5 larvæ (?); grass.
6. Female; Mintlaw, Aberdeenshire; 11th January 1910; stomach full: skin of a caterpillar; 51 leather jackets and 94 pieces of the skins of leather jackets (*Tipula* sp.); 2 larvæ (*Muscidæ*); 2 weevils (*Sitones tibialis*); husks and fragments of corn grains; 5 whole grains; 117 perianths of rushes (*Juncaceæ*).
 7. Female; Mintlaw, Aberdeenshire; 12th January 1910; stomach full: husks and fragments of corn grains; 15 whole grains—8 sprouted; remains of 1 larva (*Coleoptera*); 1 larva (*Muscidæ*); 56 leather jackets (*Tipula* sp.); remains of 2 caterpillars (?); 2 beetles (*Philonthus corvinus* P. æneus); 34 perianths of rushes (*Juncaceæ*).
 8. Male; Kennethmont, Aberdeenshire; 3rd February 1910; stomach full: husks and fragments of corn grains; 2 whole grains; 1 seed—spurrey (*Spergula arvensis*); remains of a fleshy fruit, probably rose (*Rosa* sp.); fragments of beetles (?); sand; cinders.
 9. Male; Clatt, Aberdeenshire; 3rd February 1910; stomach about half full: husks and fragments of corn grains; 1 whole grain; 2 seeds—spurrey (*Spergula arvensis*).
 10. Male; Mintlaw, Aberdeenshire; 3rd February 1910; stomach full: husks and fragments of corn grains; seeds—large number of spurrey (*Spergula arvensis*), large number of chickweed (*Stellaria media*), probably knot-grass (*Polygonum aviculare*), probably sheep-sorrel (*Rumex acetosella*), *Leguminosæ*; 3 leather jackets (*Tipula* sp.); sand.
 11. Female; Mintlaw, Aberdeenshire; 4th February 1910; stomach full: content chiefly husks and fragments of corn grains; seeds—chickweed (*Stellaria media*), spurrey (*Spergula arvensis*), sheep-sorrel (*Rumex acetosella*); cinders.
 12. Male; Aberdeen; 10th February 1910; stomach full: husks and fragments of corn grains; grass; 7 molluscs (2 *Zonites nitidulus*, 5 *Helix rotundata*); forceps of an earwig (*Forficulidæ*); remains of a larva (*Coleoptera*); 1 weevil (*Otiorrhynchus monticola*) (Walt.); fragments of chitin.
 13. Male; Elgin, Morayshire; 3rd March 1910; stomach almost empty: fragments of beetles (*Carabidæ*); head of a larva (*Coleoptera*); stones.
 14. Male; Elgin, Morayshire; 3rd March 1910; stomach almost empty: fragments of a few weevils; husks of a few corn grains; stones.
 15. Male; Elgin, Morayshire; 3rd March 1910; stomach quite empty.
 16. Male; Nottingham; 3rd March 1910; stomach full: husks of corn grains; perianths of rushes (*Juncaceæ*); skins of 62 leather jackets (*Tipula* sp.); 4 land snails (*Bulimus* sp., *Zonites nitidulus*, *Helix pulchella*, *Pupa* sp.); 1 caddis-worm tube (*Sericostoma*).
 17. Sex (?); found in stomach of tawny owl from Murtle; 16th May 1910; stomach full: remains of 10 caterpillars (*Noctuæ*).
 18. Female; Aberdeen; 8th June 1910; stomach quite empty.
 19. Female; Donmouth, Aberdeen; 11th July 1910; stomach full: 26 leather jackets (*Tipula* sp.); skin of a caterpillar (?); remains of a beetle (*Elateridæ*); grass; earth.
 20. Male; Donmouth, Aberdeen; 11th July 1910; stomach about three-quarters full: 11 leather jackets (*Tipula* sp.); fragments of rove beetles (*Staphylinidæ*); remains of 1 wire-worm; grass; perianths of rushes (*Juncaceæ*); earth; 3 stones.
 21. Male; Donmouth, Aberdeen; 12th July 1910; stomach full: 19 leather jackets (*Tipula* sp.); 1 beetle (*Rhagonycha elongata*), fragments of several beetles (?); leg of a weevil (*Otiorrhynchus* sp.); grass; earth.

22. Female ; Donmouth, Aberdeen ; 12th July 1910 ; stomach full : 24 leather jackets (*Tipula* sp.) ; 1 snail (*Bulimus lubricus*) ; remains of a weevil (*Otiorrhynchus* sp.) ; thorax of a beetle ; grass ; earth.
23. Female ; Donmouth, Aberdeen ; 12th July 1910 ; stomach full : leather jackets (*Tipula* sp.) ; remains of 3 spiders (?) ; remains of a wire-worm ; fragments of beetles (?) ; earth.
24. Sex (?) ; Aberdeen ; 20th July 1910 ; stomach quite empty.
25. Female ; Nigg, Kincardineshire ; 4th August 1910 ; stomach full : beetles—(fragments of *Pterostichus* sp.), (*Xantholinus glabratus*), (*Tachinus rufipes*), (*Philonthus aeneus*), (*Loricera pilicornis*) ; remains of a centipede (*Scolopendra* sp.) ; remains of a leather jacket (*Tipula* sp.) ; eggs of an insect (*Tipula* sp.) ; seeds—probably of the crowberry (*Empetrum nigrum*).
26. Male ; Nigg, Kincardineshire ; 4th August 1910 ; stomach about half full : weevils (*Sitones tibialis*) ; beetles—4 heads of ground beetles (*Carabidae*), 1 head of a rove beetle (*Staphylinidae*), abdomen of a beetle (?) ; seeds—crowberry (*Empetrum nigrum*) in very large numbers ; 1 grass fruit (probably of oat).
27. Female ; Maud, Aberdeenshire ; 15th November 1910 ; stomach full : 28 corn grains, majority sprouted, husks of grain ; grass ; 1 seed persicaria (*Polygonum Persicaria*) ; fragment of a weevil ; elytra of 4 beetles (?) ; 3 larvæ (*Coleoptera*) ; remains of 2 leather jackets (*Tipula* sp.) ; skin of a caterpillar (?) ; 2 whole and remains of 3 spiders (*Neriene bicolor*) ; sand.
28. Male ; Aberdeen ; 25th November 1910 ; stomach quite empty.

Summary :—8 contained insects of injurious group ; 5, beneficial group ; 6, indifferent group ; 17, larvæ ; 4, spiders ; 4, snails ; 1, centipede ; 1, earwig ; 14, grain ; 10, seeds, &c., of weeds ; 8, grass.

MAGPIE (*Pica rustica*, Scopoli).

1. Male ; Whitehouse, Aberdeenshire ; 28th March 1910 ; stomach about three-quarters full : husks of corn grains ; remains of the skins of 2 caterpillars ; a few complete, and many fragments of cases of caddis-worms (*Sericostoma*) ; stones.

JACKDAW (*Corvus monedula*, Linn.).

1. Female ; Portrèe, Skye ; 25th February 1910 ; stomach full : filled with fragments and husks of corn grains ; 19 whole grains ; fragments of a weevil (?) ; stones.

Summary :—Contained an insect of the injurious group.

CARRION-CROW (*Corvus corone*, Linn.).

1. Male ; Mintlaw, Aberdeenshire ; 28th January 1910 ; stomach about half full : 17 whole corn grains, several of which had sprouted, and many husks and fragments of grains ; a few pieces of grass ; cinders and stones.
2. Male ; Mintlaw, Aberdeenshire ; 28th January 1910 ; stomach about half full : 49 whole corn grains and many husks and fragments of grains ; stones.
3. Female ; Kennethmont, Aberdeenshire ; 2nd March 1910 ; stomach almost quite empty : a few pieces of withered grass ; 2 small pieces of bone.
4. Male ; Cove, Kincardineshire ; 2nd August 1910 ; stomach full : remains of 1 small crab ; remains of 1 insect (*Muscide*, *Anthomyidæ*) ; some small discs, possibly from the body of insect or larva ;

eggs of daddy-longlegs (*Tipula* sp.); fragments of shells; a few small pieces of brown seaweed; 56 seeds, probably of the crowberry (*Empetrum nigrum*); sand. In the intestine were numerous seeds in the same condition as those in the stomach.

5. Male; Balmedie, Aberdeenshire; 28th November 1910; stomach about one-third full: remains of corn grains; remains of 1 small larva (*Coleoptera*); remains of 3 beetles (*Staphylinidæ*, *Xantholinus* sp.); several empty egg-cases of a buckie; sand and stones.

Summary:—3 contained grain; 2, grass; 1, seeds; 2, remains of insects; 1, seaweed; 1, shells; 1, egg-cases.

HOODED CROW (*Corvus cornix*, Linn.).

1. Male; New Machar, Aberdeenshire; 26th April 1910; stomach very full: packed with fragments and husks of corn and 23 whole grains; some fragments of weevils; some fragments of bone; sand.
2. Female; Fordoun, Kincardineshire; 2nd September 1910; stomach full: 97 whole grains of barley and 1 corn grain; many husks and fragments of broken grains; some broken pieces of shell; stones.
3. Female; Fordoun, Kincardineshire; 2nd November 1910; stomach full: 62 whole barley grains and 4 corn grains; husks and fragments of broken grain; 3 shells—limpet (*Patella vulgata*), periwinkle (*Littorina tenebrosa*), dog whelk (*Purpura lapillus*)—all small; sand and stones.

Summary:—3 contained grain; 1, insects of injurious group; 2, shells; 1, bone.

ROOK (*Corvus frugileus*, Linn.).

1. Male; Auldearn, Nairnshire; 1st December 1909; stomach full: packed with remains of corn grains and of potato tubers in approximately equal quantity; seeds—1 dead nettle (*Lamium* sp.); stones; in the intestine 2 seeds, . . . sheep-sorrel (*Rumex acetosella*), were found.
2. Male; Pitfodels, Aberdeenshire; 15th January 1910; stomach full: a few husks of corn grains; a large quantity of bread; stones.
3. Female; Aboyne, Aberdeenshire; 7th February 1910; stomach very full: Indian corn, probably got from a pheasant's feeding-dish; stones.
4. Male; Portree, Skye; 25th February 1910; stomach full: pieces of potato tubers; 12 whole and many husks and fragments of corn grains; 2 whole and remains of several egg-cases of a mollusc (*Nassa*, probably *incrassata*); one complete larva and remains of a second of a ground beetle (*Carabidæ*).
5. Female; Lumsden, Aberdeenshire; 14th April 1910; stomach full: 29 whole grains of corn and a large quantity of broken grains; a few pieces of grass; remains of 7 larvæ (*Diptera*); stones.
6. Male; Lumsden, Aberdeenshire; 14th April 1910; stomach full: filled with remains of corn grains; remains of 1 wire-worm; 2 leather jackets (*Tipulidæ*); earth.
7. Male; Lumsden, Aberdeenshire; 14th April 1910; stomach full: packed with husks and fragments of corn; 1 whole corn grain, sprouted; stones.
8. Male; Lumsden, Aberdeenshire; 14th April 1910; stomach full: packed with husks and fragments of corn grains; 14 whole corn grains; fragments of several weevils; stones.

9. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach about quarter full : husks and fragments of corn grains ; stones.
10. Male ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach about three-quarters full : remains of earth-worms ; remains of several weevils ; 1 beetle (*Sulpha nigrita*) ; heads of rushes (*Juncaceæ*) ; grass ; stones.
11. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach almost empty : a few husks of corn grains ; a few sprouted chickweed seeds (*Stellaria media*) ; remains of several weevils.
12. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach full : chiefly filled with stones and sand ; remains of weevils ; a few fragments of corn grains ; a few pieces of withered grass.
13. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach empty : 1 corn grain ; 2 stones.
14. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach almost empty : a few fragments of corn grains ; 4 stones.
15. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach full : packed with husks and fragments of corn grains ; 7 whole grains ; stones.
16. Female ; Lumsden, Aberdeenshire ; 14th April 1910 ; stomach almost empty : a few fragments of corn grains ; 1 larva (*Diptera*) ; stones.
17. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach full : packed with stones and earth ; 12 corn grains.
18. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach almost empty : a few fragments of corn grains ; sand ; stones.
19. Male ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach full : packed with fragments of corn grains ; 22 whole grains ; 1 larva (*Diptera*) ; stones.
20. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach almost empty : a few husks of corn ; stones.
21. Male ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach full : packed with husks of corn grains ; sand.
22. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach quite empty.
23. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach about one-third full : 5 whole corn grains and remains of corn grains ; stones.
24. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach empty : husk of 1 corn grain ; stones.
25. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach about half full : bulk of content stones and earth ; a few husks of corn.
26. Female ; Lumsden, Aberdeenshire ; 15th April 1910 ; stomach empty : fragment of weevil ; 2 stones.
27. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : packed with remains of corn grains ; remains of several wire-worms ; stones.
28. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach almost empty : remains of a few corn grains ; 6 heads of rushes (*Juncaceæ*) ; stones.
29. Male ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : packed with husks and fragments of corn grains ; 7 whole grains ; stones.
30. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : packed with husks and fragments of corn grains ; 1 whole grain ; fragments of several weevils ; stones.
31. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach almost empty : 2 small pieces of grass ; husks of a few corn grains ; stones.
32. Male ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full :

- packed with husks and fragments of corn grains ; 6 whole grains ; stones.
33. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach about a quarter full : skin of 1 caterpillar ; remains of 14 wire-worms ; remains of several larvæ (*Diptera*) ; a few husks of corn ; stones.
 34. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach about a quarter full : husks and fragments of corn grains ; fragments of chitin ; stones.
 35. Male ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : packed with fragments and husks of corn grains ; a few small pieces of chitin ; stones.
 36. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach about half full : fragments of several weevils ; husks of corn ; stones.
 37. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach three-quarters full : husks and fragments of corn grains ; 4 whole grains ; stones.
 38. Female ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : bulk of content large stones ; a few fragments of corn.
 39. Male ; Lumsden, Aberdeenshire ; 16th April 1910 ; stomach full : packed with husks and fragments of corn grains ; fragments of several weevils ; remains of 1 wire-worm ; stones.
 40. Male ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach full : packed with fragments and husks of corn grains ; stones.
 41. Female ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach full : packed with husks and fragments of corn grains ; 5 whole grains ; stones.
 42. Female ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach about half full : fragments and husks of corn ; 1 blade of grass ; remains of 1 wire-worm.
 43. Female ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach about one-third full : husks and fragments of corn ; fragment of 1 weevil ; stones.
 44. Female ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach almost empty : husk of 1 corn grain ; grass ; stones.
 45. Female ; Lumsden, Aberdeenshire ; 18th April 1910 ; stomach almost empty : a few corn husks ; 4 stones.
 46. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach full : packed with husks and fragments of corn ; 8 whole grains ; a few fragments of weevil's legs (*Otiorrhynchus*) ; stones.
 47. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach quite empty.
 48. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach almost empty : a few husks of corn.
 49. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach full : husks and fragments of corn grains ; fragments of several weevils ; stones ; stones and corn in almost equal proportions.
 50. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach about half full : stones.
 51. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach about half full : fragments and husks of corn grains ; 2 small pieces of grass ; stones.
 52. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach about quarter full : fragment of 1 weevil ; stones.
 53. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach about half full : fragments and husks of corn grains ; a piece of potato ; a small piece of grass ; fragment of 1 weevil.
 54. Female ; Lumsden, Aberdeenshire ; 19th April 1910 ; stomach almost empty : a few fragments of corn.

55. Female ; Auldearn, Nairnshire ; 21st April 1910 ; stomach very full : husks and fragments of corn ; 12 whole grains ; small pieces of potato ; 2 seeds plantain (*Plantago lanceolata*) ; remains of a grey slug (*Limax* sp.) ; remains of 3 earth-worms ; 1 spider (*Neriene rubens*) ; larvæ—1 leather jacket (*Tipulidæ*), 1 larva (*Diptera*), 1 larva (*Muscidæ*), 2 larvæ (*Coleoptera*, *Carabidæ*) ; 5 weevils (*Sitones tibialis*) ; 2 beetles (*Philonthus laminatus*) ; 3 beetles (*Agriotes obscurus*) ; stones.
56. Female ; Auldearn, Nairnshire ; 21st April 1910 ; stomach about half full : husks and fragments of corn ; 1 whole grain ; fragment of 1 weevil ; remains of 1 wire-worm ; 1 seed (*Polygonum* sp.) ; stones.
57. Female ; Auldearn, Nairnshire ; 21st April 1910 ; stomach about half full : fragments and husks of corn grains ; stones.
58. Female ; Auldearn, Nairnshire ; 22nd April 1910 ; stomach full : remains of several earth-worms ; larva of a ground beetle ; 3 wire-worms ; 2 larvæ (*Diptera*) ; 1 larva (probably of *Bibio*) ; 22 skins of larvæ (too much digested for identification) ; 4 pupæ of flies (*Muscidæ*) ; husks and fragments of corn ; 42 whole grains ; 1 spurrey seed (*Spergula arvensis*) ; stones.
59. Female ; Auldearn, Nairnshire ; 22nd April 1910 ; stomach about one-third full : 14 larvæ (*Diptera*) ; fragments and husks of corn ; stones.
60. Female ; Auldearn, Nairnshire ; 22nd April 1910 ; stomach almost empty : fragments of several weevils.
61. Sex (?) ; Auldearn, Nairnshire ; 16th May 1910 ; stomach full : fragments and husks of corn ; 74 whole grains ; fragments of several beetles ; stones.
62. Female ; Auldearn, Nairnshire ; 16th May 1910 ; stomach almost empty : a few fragments of corn grains ; fragments of several weevils ; stones.
63. Male ; Auldearn, Nairnshire ; 16th May 1910 ; stomach full : 55 corn grains ; fragments and husks of corn ; 7 leather jackets (*Tipulidæ*) ; 16 beetles (*Elater nigrinus*) ; weevils (1 *Otiorrhynchus picipes*, 2 whole and the remains of 9 *Sitones tibialis*) ; stones.
64. Male ; Auldearn, Nairnshire ; 16th May 1910 ; stomach about half full : fragments and husks of corn grain ; fragments of several weevils ; stones.
65. Male ; Auldearn, Nairnshire ; 16th May 1910 ; stomach about one-third full : fragments and husks of corn grains ; fragments of chitin ; piece of a cockle-shell ; stones.
66. Female ; Auldearn, Nairnshire ; 17th May 1910 ; stomach almost empty : a few fragments of corn grains ; a few fragments of chitin ; stones.
67. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach full : husks and fragments of corn grains, 24 whole sprouted grains ; small pieces of potato ; fragments of weevils ; stones.
68. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach almost empty : a few husks of corn grains ; 2 stones.
69. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about quarter full : husks and fragments of grain ; legs of weevils (*Otiorrhynchus*) ; 4 amphicælus vertebrae ; pieces of shell ; stones.
70. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about half full : husks and fragments of corn grains ; remains of several beetles (?) ; stones.
71. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about half full : husks and fragments of corn grains ; remains of weevils ; remains of beetles ; stones.

72. Female ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about half full : packed with fragments and husks of corn grains ; 10 whole grains ; stones.
73. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach almost empty : a few fragments of corn grains ; a few fragments of chitin.
74. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about half full : fragments of beetles (?) ; fragments of weevils (?) ; 1 whole and the remains of 6 wire-worms ; a few fragments of grain ; stones.
75. Sex (?) ; Auldearn, Nairnshire ; 17th May 1910 ; stomach full : packed with husks and fragments of corn grains ; a few fragments of chitin ; stones.
76. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach full : 20 leather jackets (*Tipulidæ*) ; 3 wire-worms ; 4 weevils (*Sitones tibialis*) ; 111 grains of barley ; husks and fragments of grain ; stones.
77. Male ; Auldearn, Nairnshire ; 17th May 1910 ; stomach about one-third full : fragments and husks of grain ; fragments of chitin ; sand.
78. Female ; Auldearn, Nairnshire ; 18th May 1910 ; stomach about three-quarters full : fragments and husks of grain ; fragments of several weevils ; stones.
79. Sex (?) ; Auldearn, Nairnshire ; 18th May 1910 ; stomach full : husks and fragments of corn grains ; 5 whole grains ; pieces of potato ; a few fragments of chitin ; stones.
80. Female ; Auldearn, Nairnshire ; 18th May 1910 ; stomach about three-quarters full : 40 whole corn grains, the majority sprouted ; fragments and husks of grains ; remains of 1 weevil (?) ; stones.
81. Male ; Auldearn, Nairnshire ; 18th May 1910 ; stomach almost empty : a few husks of grain ; fragments of 2 weevils ; stones.
82. Male ; Auldearn, Nairnshire ; 18th May 1910 ; stomach almost empty : a few grain husks ; a few pieces of chitin ; sand.
83. Male ; Auldearn, Nairnshire ; 18th May 1910 ; stomach full : 38 corn grains, the majority sprouted ; fragments and husks of grains ; 2 beetles (*Agriotes obscurus*) ; fragments of chitin ; remains of 1 earth-worm ; 1 empty pupa case (*Diptera, Cyclorapha*) ; stones.
84. Male ; Auldearn, Nairnshire ; 18th May 1910 ; stomach about three-quarters full : fragments and husks of grain ; remains of 12 wire-worms ; fragments of beetles and of weevils ; stones.
85. Male, Auldearn, Nairnshire ; 18th May 1910 ; stomach almost empty : a few husks of grain ; a few fragments of chitin ; 2 stones.
86. Female ; Auldearn, Nairnshire ; 18th May 1910 ; stomach about three-quarters full : bulk of content stones ; some fragments and husks of grain ; some fragments of chitin.
87. Male ; Auldearn, Nairnshire ; 18th May 1910 ; stomach full : 83 grains of corn and barley, the majority sprouted ; husks and fragments of grain ; a few fragments of chitin ; stones.
88. Male ; Auldearn, Nairnshire ; 19th May 1910 ; stomach almost empty : a few husks of grain ; stones.
89. Female ; Auldearn, Nairnshire ; 19th May 1910 ; stomach almost empty : a few fragments of corn ; 2 small pieces of chitin.
90. Male ; Auldearn, Nairnshire ; 19th May 1910 ; stomach full : packed with husks and fragments of corn and barley grains ; sand.
91. Female ; Auldearn, Nairnshire ; 19th May 1910 ; stomach quite empty.
92. Female ; Auldearn, Nairnshire ; 19th May 1910 ; stomach about quarter full : a few husks of grain ; fragments of weevils ; some spurrey seeds (*Spergula arvensis*) ; sand.

93. Male ; Auldearn, Nairnshire ; 19th May 1910 ; stomach about three-quarters full : husks and fragments of grains ; fragments of weevils ; remains of several pupa cases (*Diptera, Cyclorhapha*) ; sand.
94. Male ; Auldearn, Nairnshire ; 19th May 1910 ; stomach about half full : fragments of grain ; fragments of several weevils ; stones.
95. Female ; Auldearn, Nairnshire ; 19th May 1910 ; stomach almost empty : a few grain husks ; a few fragments of chitin ; 2 stones.
96. Male ; Auldearn, Nairnshire ; 19th May 1910 ; stomach about quarter full : fragments of grain ; fragments of several weevils and of chitin ; sand.
97. Male ; Dunecht, Aberdeenshire ; 19th May 1910 ; stomach full : packed with much digested remains of corn and barley ; fragments of chitin ; a few small pieces of potato ; stones.
98. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach about three-quarters full : fragments and husks of grain and 1 barley grain ; legs of beetles and fragments of chitin ; stones.
99. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach about half full : husks and fragments of grain ; fragments of chitin and 1 leg of a beetle ; stones (= about half the content).
100. Female ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach about two-thirds full : 23 leather jackets (*Tipulidæ*) ; fragments of chitin ; 7 corn grains and a few fragments of grains ; a few pieces of grass (*Aira caespitosa*) ; sand.
101. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach about one-third full : husks of grain, bulk of content ; a few fragments of chitin ; stones.
102. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach full : 12 leather jackets (*Tipulidæ*) ; 1 wire-worm ; 29 grains of corn and barley, the majority sprouted ; husks and fragments of grain ; many fragments of beetles and weevils ; stones.
103. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach full : 25 grains of corn and fragments and husks of grain ; a few pieces of grass ; remains of 9 leather jackets (*Tipulidæ*) ; fragments of chitin ; stones.
104. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach full : husks and fragments of grain ; remains of several leather jackets (*Tipulidæ*) ; remains of several beetles (?) ; and of weevils (?) ; stones.
105. Male ; Dunecht, Aberdeenshire ; 21st May 1910 ; stomach almost empty : a few small pieces of grass ; a few pine needles.
106. Male ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach full : packed with husks and fragments of grain ; a few small pieces of chitin ; stones.
107. Male ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach about half full : bulk of content earth ; some husks of grain ; a few small pieces of chitin.
108. Female ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach about one-third full : husks of grain ; a few fragments of chitin ; stones.
109. Female ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach almost empty : a few remains of corn husks ; 7 stones.
110. Female ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach about quarter full : bulk of content was earth and stones ; some small pieces of potato ; some remains of corn husks ; a few fragments of chitin.
111. Male ; Dunecht, Aberdeenshire ; 23rd May 1910 ; stomach about three-quarters full : fragments and husks of grain ; small pieces of potato ; some fragments of weevils (?) ; stones.

112. Sex (?); Dunecht, Aberdeenshire; 23rd May 1910; stomach full: 40 leather jackets (*Tipulidæ*); fragments of chitin; a few husks of grain; stones.
113. Female; Dunecht, Aberdeenshire; 23rd May 1910; stomach about half full: bulk of content was earth and stones; a few grain husks; fragments of chitin.
114. Female; Dunecht, Aberdeenshire; 23rd May 1910; stomach full: husks and fragments of grain; some pieces of potato; fragments of chitin and legs of beetles (?); 7 leather jackets (*Tipulidæ*); stones.
115. Male; Dunecht, Aberdeenshire; 23rd May 1910; stomach full: packed with husks and fragments of corn grains; 19 whole corn grains; a few pieces of grass; remains of some beetles (?); 1 large stone and sand.
116. Male; Dunecht, Aberdeenshire; 23rd May 1910; stomach full: packed with fragments and husks of corn; 19 whole corn grains; a few fragments of chitin; stones.
117. Female; Dunecht, Aberdeenshire; 23rd May 1910; stomach full: packed with husks and fragments of corn; remains of wire-worms; remains of weevils (?); stones.
118. Female; Dunecht, Aberdeenshire; 25th May 1910; stomach about half full: husks of grain; 1 ovary of a grass (probably *Bromus* sp.); remains of several weevils (?); stones.
119. Female; Dunecht, Aberdeenshire; 25th May 1910; stomach about half full: bulk of content was earth and stones; a few husks of grain; remains of 4 wire-worms; remains of 3 leather jackets (*Tipulidæ*); fragments of chitin; 1 seed of persicaria (*Polygonum Persicaria*).
120. Female; Dunecht, Aberdeenshire; 25th May 1910; stomach almost empty: a few grain husks; a few small pieces of chitin; stones.
121. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach about three-quarters full: small pieces of potato; remains of 34 leather jackets (*Tipulidæ*); stones.
122. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach almost empty: remains of 1 corn grain; remains of 1 beetle (?); stones.
123. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach full: 25 leather jackets (*Tipulidæ*); a few small pieces of potato; sand.
124. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach quite empty.
125. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach about three-quarters full: 21 whole and remains of several leather jackets (*Tipulidæ*); skin of a caterpillar (*Noctuæ*); 1 small piece of potato; stones.
126. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach about three-quarters full: 17 whole and remains of several leather jackets (*Tipulidæ*); remains of 1 rove beetle (*Staphylinidæ*); 1 weevil (*Sitones tibialis*); remains of 1 earth-worm; some pieces of grass; 1 corn grain; stones.
127. Male; Dunecht, Aberdeenshire; 25th May 1910; stomach about half full: 8 whole and remains of a few leather jackets (*Tipulidæ*); earth and stones.
128. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach about half full: bulk of content was stones and sand; 3 whole and remains of several wire-worms; 1 larva (*Diptera*).
129. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach full: remains of 10 leather jackets (*Tipulidæ*); 2 wire-worms; 7 beetles (6 *Agriotes obscurus*, 1 *Cytilus varius*); 1 weevil (*Sitones tibialis*); pieces of potato; husks of grain; stones.

130. Female; Dunecht, Aberdeenshire; 26th May 1910; stomach about quarter full: remains of 6 leather jackets (*Tipulidæ*); some fragments of chitin; a few pieces of potato; sand.
131. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach about three-quarters full: 8 leather jackets (*Tipulidæ*); remains of earth-worms; earth.
132. Female; Dunecht, Aberdeenshire; 26th May 1910; stomach about three-quarters full: remains of 19 leather jackets (*Tipulidæ*); some pieces of potato; sand.
133. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach about quarter full: pieces of potato; remains of 2 weevils (*Sitones* sp.); sand.
134. Female; Dunecht, Aberdeenshire; 26th May 1910; stomach full: 25 whole leather jackets and remains of several (*Tipulidæ*); 1 weevil and remains of several (*Sitones tibialis*); 2 caterpillars (*Agrotis* sp.); earth.
135. Sex (?); Dunecht, Aberdeenshire; 26th May 1910; stomach about quarter full: 3 leather jackets (*Tipulidæ*); a few corn husks; stones.
136. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach partly shot away: fragments of wire-worms; fragments of beetles; stones.
137. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach full: 22 leather jackets (*Tipulidæ*); many pieces of potato; sand.
138. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach full: filled with pieces of potato; 7 leather jackets (*Tipulidæ*); a few clover leaves (*Trifolium* sp.); stones.
139. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach almost empty: a few grain husks; stones.
140. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach full: remains of 20 leather jackets (*Tipulidæ*); fragments of weevils (*Rhynchophora*); 1 beetle (*Agriotes obscurus*); fragments of beetles (*Elateridæ*, and *Calathus* sp.); 1 barley grain; pieces of potato; stones.
141. Male; Dunecht, Aberdeenshire; 26th May 1910; stomach full: packed with pieces of potato; 3 leather jackets (*Tipulidæ*); fragments of weevils (*Rhynchophora*); stones.
142. Female; Mintlaw, Aberdeenshire; 30th May 1910; stomach almost empty: remains of four leather jackets (*Tipulidæ*); remains of 1 seed (?); 2 pieces of grass; stones.
143. Female; Mintlaw, Aberdeenshire; 30th May 1910; stomach almost empty.
144. Male; Mintlaw, Aberdeenshire; 30th May 1910; stomach about half full: 12 leather jackets (*Tipulidæ*); remains of 1 insect (*Muscidæ*, *Scatophaga* sp.); earth.
145. Female; Mintlaw, Aberdeenshire; 30th May 1910; stomach full: 42 leather jackets (*Tipulidæ*); 1 wire-worm; remains of 1 earth-worm; remains of 1 weevil; remains of 2 caterpillars (?); abdomen of 1 beetle (?); 9 sprouted corn grains; grass; stones.
146. Male; Mintlaw, Aberdeenshire; 31st May 1910; stomach full: 35 leather jackets; pieces of potato; husk of 1 barley grain; stones.
147. Male; Mintlaw, Aberdeenshire; 31st May 1910; stomach almost empty: fragments of chitin; stones.
148. Female; Mintlaw, Aberdeenshire; 31st May 1910; stomach empty: 2 stones.
149. Female; Cluny, Aberdeenshire; 8th July 1910; stomach full: packed with husks and fragments of corn grains and of Indian corn; 1 seed (*Polygonum* sp.); remains of 1 insect (*Diptera*); stones.

150. Male; Cluny, Aberdeenshire; 14th July 1910; stomach full: remains of 14 larvæ (*Lepidoptera*); 2 ichneumon flies (*Ichneumon gracilentus*, *I. luctatorius*); fragments of beetles (5 *Pterostichus* sp. and part of a rove beetle, *Staphylinus*); remains of 1 spider (?); grass; stones.
151. Female; Cove, Kincardineshire; 25th July 1910; stomach full: packed with pieces of potato; 3 snail's eggs (?); beetles (1 *Calathus cisteloides*) and fragments of *Pterostichus* sp.; 1 weevil (*Otiorrhynchus atroapterus*) and fragments of weevils; remains of 1 insect (*Tipula* sp.); eggs of *Tipula* sp.; stones.
152. Male; Nigg, Kincardineshire; 25th July 1910; stomach full: packed with pieces of potato; remains of earth-worms; fragments of beetles and of weevils (?); grass; stones.
153. Female; Belhelvie, Aberdeenshire; 5th August 1910; stomach about quarter full: grass; fragments of weevils (*Otiorrhynchus* sp.); heads of 2 beetles (*Pterostichus* sp.); bones of a small frog; stones.
154. Female; Cove, Kincardineshire; 9th August 1910; stomach full: fragments of corn grains and 7 whole grains; pieces of potato; grass; eggs of insects present in thousands (*Tipula* sp.); heads of 2 rove beetles (*Staphylinidæ*); fragments of weevils; stones.
155. Male; Nigg, Kincardineshire; 9th August 1910; stomach about three-quarters full: 4 pieces of potato; husks of grain; 2 insects (*Tipula oleracea*); eggs of insect (*Tipula* sp.); remains of head of 1 weevil (?); 2 larvæ of Lamellicorn beetles; stones.
156. Female; Black Dog, Aberdeenshire; 12th August 1910; stomach half full: part of the vertebral column of a small mammal (probably field-mouse); eggs of insect in very large number (*Tipula* sp.); fragments of chitin.
157. Female; Parkhill, Aberdeenshire; 13th August 1910; stomach full: bulk of content was disorganised vegetable matter; eggs of insect present in thousands (*Tipula* sp.); remains of 5 daddy-longlegs (*Tipula* sp.); 1 ichneumon fly (*Ichneumon gracilentus*); 1 grasshopper (*Locusta viridissima*); remains of 1 spider (?); stones.
158. Male; Balgownie, Aberdeenshire; 22nd August 1910; stomach about half full: remains of 20 daddy-longlegs (*Tipula* sp.); abdomen of a humble bee (*Bombus* sp.); very large number of eggs of an insect (*Tipula* sp.); sand.
159. Male; Balgownie, Aberdeenshire; 22nd August 1910; stomach about quarter full: whole content was remains of daddy-longlegs (*Tipula* sp.); eggs of insects (*Tipula* sp.).
160. Female; Balgownie, Aberdeenshire; 24th August 1910; stomach full: whole content was remains of daddy-longlegs (*Tipula* sp.), and cast skins of earwigs (*Forficulidæ*); eggs of insect present in thousands (*Tipula* sp.); grass; stones.
161. Female; Balgownie, Aberdeenshire; 31st August 1910; stomach about half full: grass; 1 leaf (*Polygonum*, probably *aviculare*); eggs of insects in very large numbers (*Tipula* sp.); fragments of chitin; earth; stones.
162. Female; Balgownie, Aberdeenshire; 31st October 1910; stomach about half full: bulk of content was stones and sand; a few grain husks.

Summary.—122 contained grain; 26, potato; 21, grass; 14, seeds and leaves of weeds; 2, Indian corn; 1, pine needles; 8, remains of earth-worms; 49, remains of insects; 10, insects of indifferent group; 5, beneficial group; 56, injurious group; 1, grasshopper; 3, spiders; 1, earwigs; 3, pupæ; 48, larvæ; 9, eggs of insect; 5, molluscs or their eggs; 3, bone (fish, frog, mammal); 1, bread.

SKYLARK (*Alauda arvensis*, Linn.).

1. Male ; Kennethmont, Aberdeenshire ; 2nd March 1910 ; stomach empty.
2. Male ; Aberdeen ; 17th March 1910 ; stomach full : content chiefly grass ; 1 seed (*Alisma* sp.) ; stones.

Summary.:—1 contained grass ; 1, seed.

GREAT SPOTTED WOODPECKER (*Dendrocopus major*, Linn.).

1. Female ; Cluny, Aberdeenshire ; 26th November 1909 ; stomach about three-quarters full : remains of 9 larvæ of the boring beetle (*Rhagium*) ; fragments of several beetles (?).

Summary.:—Contained insects of the injurious group.

LONG-EARED OWL (*Asio otus*, Linn.).

1. Male ; Balmedie, Aberdeenshire ; 22nd November 1909 ; stomach empty.
2. Female ; Locality (?) ; 31st January 1910 ; stomach full : remains of 2 field-mice (*Mus sylvaticus*), of a blackbird (*Turdus Merula*) ; husks of grain.
3. Male ; Locality (?) ; 6th February 1910 ; stomach full : skeleton and fur of a field-mouse (*Mus sylvaticus*) ; skeleton and fur of a field-vole (*Microtus agrestis*).
4. Male ; Mintlaw, Aberdeenshire ; 4th February 1910 ; stomach about half full : 1 field-mouse (*Mus sylvaticus*).
5. Male ; Braemar, Aberdeenshire ; 17th February 1910 ; stomach full : 2 shrews (*Sorex* sp.) ; 1 field-vole (*Microtus agrestis*).
6. Male ; Aberdeenshire ; 3rd March 1910 ; stomach half full : remains of 1 shrew (*Sorex* sp.).
7. Male ; Udney, Aberdeenshire ; 6th April 1910 ; stomach almost empty : a few black feathers.
8. Female ; Fraserburgh, Aberdeenshire ; 15th April 1910 ; stomach almost empty : tooth of a small rodent.
9. Male ; Ellon, Aberdeenshire ; 19th April 1910 ; stomach empty : 2 small pellets of grey hair.
10. Male ; Drumoak, Aberdeenshire ; 7th July 1910 ; stomach almost empty : remains of a few feathers.
11. Male ; Fintry, Aberdeenshire ; 17th August 1910 ; stomach full : head of a water-rat.
12. Female ; Cluny, Aberdeenshire ; 9th December 1910 ; stomach empty.

Summary.:—3 contained field-mice ; 1, a bird ; 2, voles ; 2, shrews ; 1, water-rat ; 2, feathers ; 1, hair ; 1, husks of grain.

SHORT-EARED OWL (*Asio accipitrinus*, Pallas).

1. Male ; Locality (?) ; 25th January 1910 ; stomach full : remains of a small mammal (?) ; remains of a small bird (?).
2. Female ; Aberdeenshire ; 4th February 1910 ; stomach full : remains of 3 field-mice (*Mus sylvaticus*) ; remains of 1 vole (*Microtus agrestis*).
3. Male ; Peterhead, Aberdeenshire ; 28th December 1910 ; stomach quite empty.

Summary.:—1 contained bird ; 1, small mammal (?) ; 1, mice ; 1, vole.

TAWNY OWL (*Syrnium aluco*, Linn.).

1. Male ; New Machar, Aberdeenshire ; 15th November 1909 ; stomach empty.
2. Male ; Stonehaven, Kincardineshire ; 15th November 1909 ; stomach almost empty : grass ; a few fragments of chitin ; stones.
3. Female ; Gourdon, Kincardineshire ; 24th November 1909 ; stomach almost empty : grass ; a few feathers ; a few fragments of chitin ; 1 stone.
4. Female ; Locality (?) ; 2nd December 1909 ; stomach full : hair and skeleton of a mole (*Talpa* sp.).
5. Male ; Locality (?) ; 14th January 1910 ; stomach full : hair and skeleton of a shrew (*Sorex* sp.).
6. Female ; Aberdeen ; 4th February 1910 ; stomach empty.
7. Female ; Auldearn, Nairnshire ; 3rd March 1910 ; stomach filled with earth.
8. Female ; Udney, Aberdeenshire ; 21st March 1910 ; stomach empty.
9. Female ; Murtle, Aberdeenshire ; 21st March 1910 ; stomach full : fur and skeleton of a field-mouse (*Mus sylvaticus*) ; grass ; stones.
10. Male ; Dyce, Aberdeenshire ; 1st April 1910 ; stomach about half full : skeleton and feathers of a small bird (?).
11. Female ; Northumberland ; 6th April 1910 ; stomach full : remains of a bird (?) ; stones.
12. Male ; Murtle, Aberdeenshire ; 16th May 1910 ; stomach full : 1 starling (*Sturnus vulgaris*) ; grass.
13. Female ; Dyce, Aberdeenshire ; 8th July 1910 ; stomach empty.
14. Female ; Kintore, Aberdeenshire ; 1st November 1910 ; stomach about quarter full : content chiefly stones ; remains of 2 insects (*Neuroptera*, *Perla* sp.).
15. Female ; Aberdeen ; 25th November 1910 ; stomach about half full : remains of 1 shrew (*Sorex* sp.).

Summary.—3 contained birds ; 1, a mole ; 2, shrews ; 1, field-mouse ; 1, insect of indifferent group ; 1, earth ; 4, grass.

SPARROW-HAWK (*Accipiter nisus*, Linn.).

1. Female ; Stoneywood, Aberdeenshire ; 14th March 1910 ; stomach empty.
2. Male ; Banchory, Aberdeenshire ; 11th April 1910 ; stomach almost empty : fragments of a few feathers.
3. Male ; New Machar, Aberdeenshire ; 25th April 1910 ; stomach full : remains of a greenfinch (*Ligurinus chloris*).
4. Female ; Meigle, Perthshire ; 20th July 1910 ; stomach full : remains of a thrush (*Turdus* sp.).
5. Male ; Meigle, Perthshire ; 20th July 1910 ; stomach full : remains of a starling (*Sturnus vulgaris*).
6. Female ; Monymusk, Aberdeenshire ; 7th November 1910 ; stomach full : packed with small pieces of flesh.

Summary.—3 contained birds ; 1, flesh ; 1, feathers.

KESTREL (*Falco tinnunculus*, Linn.).

1. Male ; Kintore, Aberdeenshire ; 31st December 1909 ; stomach empty.
2. Male ; Mintlaw, Aberdeenshire ; 7th January 1910 ; stomach full : remains of 1 bird (thrush) ; remains of 1 field-mouse (*Mus sylvaticus*).

3. Female ; Rhynie, Aberdeenshire ; 21st November 1910 ; stomach full : remains of 3 field-voles (*Microtus agrestis*).
4. Female ; Tarves, Aberdeenshire ; 8th December 1910 ; stomach about half full : remains of a shrew.
5. Male ; Stonehaven, Kincardineshire ; 9th December 1910 ; stomach about half full : grass ; straw in pieces, 1 inch to 2½ inches long.

Summary :—1 contained voles ; 2, mice ; 1, bird.

GANNET (*Sula bassana*, Linn.).

1. Female ; Locality (?) ; 5th January 1910 ; stomach quite empty.
2. Male ; Locality (?) ; 13th January 1910 ; stomach empty : 5 stones.
3. Male ; Faroe Island ; 6th May 1910 ; stomach quite empty.

HERON (*Ardea cinerea*, Linn.).

1. Female ; Locality (?) ; 11th November 1909 ; stomach about half full : remains of fish ; grass ; sand.
2. Male ; New Deer, Aberdeenshire ; 14th January 1910 ; stomach full : 1 common trout (*Salmo fario*) ; fish-bones.
3. Male ; Locality (?) ; 14th January 1910 ; stomach almost empty : remains of the vertebral column of a fish ; 3 caddis-worms (*Sericostoma*) ; 2 snail's eggs.
4. Female ; Old Meldrum, Aberdeenshire ; 18th January 1910 ; stomach full : 1 whole, and remains of a second, frog (*Rana temporaria*) ; remains of a trout (*Salmo fario*) ; 2 beetles (*Agabus bipustulatus*) ; tail of a field-vole (*Microtus agrestis*).
5. Male ; Newburgh, Aberdeenshire ; 19th January 1910 ; stomach almost empty : a few fish remains.
6. Female ; Alford, Aberdeenshire ; 5th February 1910 ; stomach empty.
7. Female ; Udney, Aberdeenshire ; 5th February 1910 ; stomach about quarter full : a number of pellets of the hair of a small mammal, probably a rodent.
8. Male ; Rhynie, Aberdeenshire ; 5th February 1910 ; stomach about three-quarters full : remains of 2 freshwater trout (*Salmo* sp.) ; stones.
9. Male ; Huntly, Aberdeenshire ; 9th February 1910 ; stomach empty.
10. Male ; Lumphannan, Aberdeenshire ; 9th February 1910 ; stomach about half full : water-plant (*Scirpus lacustris*) ; a few bird's feathers (?) ; stones.
11. Female ; Huntly, Aberdeenshire ; 24th February 1910 ; stomach empty : 1 small fragment of chitin.
12. Female ; Huntly, Aberdeenshire ; 9th March 1910 ; a partly digested rat in the throat ; stomach full : a large quantity of frog spawn ; remains of a frog ; fish remains ; larva of beetle (?) ; tubes of caddis-worms (*Limnophilinae*) ; stones.
13. Female ; Keith, Aberdeenshire ; 6th May 1910 ; stomach full : 2 trout (*Salmo fario*) ; 1 shrew (*Sorex* sp.) ; 3 caddis-worms in tubes (*Sericostoma*) ; 1 aquatic larva (*Diptera*) ; fragments of beetles.
14. Male ; Aberdeen ; 23rd July 1910 ; stomach full : remains of 2 trout ; abdomens of 7 ladybird beetles (*Coccinellidae*) ; abdomen of 1 beetle (?) ; remains of two small crustacea (*Isopoda*) ; 1 saw-fly (*Allantus arcuatus*) ; large number of pellets of hair of a small rodent (?) ; portion of inflorescence of a grass (possibly *Glyceria fluitans*), no doubt swallowed on the prey of the bird.
15. Male ; Locality (?) ; 23rd August 1910 ; stomach full : remains of 2 burn trout ; 1 beetle (*Aphodius ater*) ; weevils (*Sitones tibialis*) ; 3

caddis-worm cases (*Limnophilus*); 3 water boatmen (*Corixa* sp.); insects—(1 *Empis tassellata*), 1 ichneumon fly (*Ichneumon* sp.), 1 insect (*Ephemeridae*), wings of an insect (*Diptera*), 13 midges (*Chironomidae* *Ceratopogon* sp.); 1 pupa (*Hymenoptera*); remains of a small snail; remains of a small crustacean (*Amphipoda*); stones.

16. Male; Ellon, Aberdeenshire; 19th October 1910; stomach empty: some grass.

Summary:—5 contained remains of rodents; 2, frogs; 10, fish; 2, snails; 3, insects of beneficial groups; 1, indifferent group; 2, injurious group; 4, larva; 2, grass; 1, a water-plant.

MALLARD (*Anas boscas*, Linn.).

1. Sex (?); Ballindalloch, Morayshire; 24th November 1909; stomach full: pieces of potato; grass; corn; seeds—spurrey (*Spergula arvensis*), dock (*Rumex* sp.), persicaria (*Polygonum Persicaria*), knot-grass (*P. aviculare*); stones.
2. Male; Donmouth, Aberdeen; 14th December 1909; stomach almost empty: fragments of an endocarp (?); stones.

Summary:—1 contained seeds; 1, potato; 1, grass; 1, corn; 1, endocarp.

TEAL (*Nettion crecca*, Linn.).

1. Male; Braemar, Aberdeenshire; 9th February 1910; stomach about half full: chiefly filled with sand; birch fruits (*Betula* sp.).

WIGEON (*Mareca penelope*, Linn.).

1. Male; Locality (?); 31st January 1910; stomach almost empty: pieces of roots of aquatic grasses or sedges; sand.

LONG-TAILED DUCK (*Harelda glacialis*, Linn.).

1. Female; Balmedie, Aberdeenshire; 26th October 1910; stomach about three-quarters full: shells, 1 valve and remains of several (*Donax* sp.), (*Littorina obtusata*); remains of an insect (*Hemiptera*, *Corixa moesta*); 35 blood-worms (larvæ of *Chironomus*).

Summary:—Contained insects of indifferent group; shells.

EIDER-DUCK (*Somateria mollissima*, Linn.).

1. Male; Orkney; 10th November 1909; stomach about half full: 2 molluscs (*Littorina obtusata*); claws of a small crab; fragments of acorn shells (*Balanus* sp.); seaweeds (*Ulveæ* and *Corallina*).
2. Male; Slains, Aberdeenshire; 21st March 1910; stomach almost empty; a few small shells and many fragments (*Mytilus edulis*); remains of crabs; stones.

Summary:—2 contained crabs; 2, shells; 1, seaweed.

GOOSANDER (*Mergus merganser*, Linn.).

1. Male; Locality (?); 2nd December 1909; stomach about half full: remains of a smolt (*Salmonidae*).

Summary:—Contained fish.

WOOD-PIGEON (*Columba palumbus*, Linn.).

1. Male; Aboyne, Aberdeenshire; 26th February 1910; crop full: swedish turnip tops; a few grains of corn, some sprouted; stomach very full: swedish turnip tops; corn grains; stones.
2. Female; Elgin, Morayshire; 3rd March 1910; crop very full: young clover leaves (*Trifolium* sp.); turnip tops; leaves of a buttercup (*Ranunculus* sp.); beech nuts (*Fagus* sp.); leaves of the sorrel (*Rumex acetosa*); roots of a fleshy composite, probably dandelion; some pieces of moss; stomach full: turnip tops; clover leaves; remains of beech nuts; fragments of roots of a composite; stones.
3. Male; Elgin, Morayshire; 3rd March 1910; crop empty; stomach almost empty: a few seeds (*Polygonum* sp.); some fragments of corn; stones.
4. Male; Elgin, Morayshire; 3rd March 1910; crop full: 205 grains of corn, about 2 dozen sprouted; a few pieces of turnip top; fragments of beech nuts (*Fagus* sp.); a few spurrey seeds (*Spergula arvensis*); stomach full: packed with corn; spurrey seeds; 3 holly seeds (*Ilex aquifolium*); stones.
5. Female; Elgin, Morayshire; 8th March 1910; crop full: filled with whole corn grains; spurrey seeds (*Spergula arvensis*); stomach full: packed with corn; broken spurrey seeds; stones.
6. Male; Strathdon, Aberdeenshire; 25th April 1910; crop about a third full: 486 corn grains, 9 sprouted; a few stones; stomach full: packed with fragments and husks of corn grains; 7 whole grains; stones.
7. Male; Strathdon, Aberdeenshire; 5th May 1910; crop about half full: 18 peas; 6 beans; 190 grains of barley and corn; 4 stones; stomach full: 1 pea; fragments of beans; husks and fragments of barley and corn grains; stones.
8. Male; Strathdon, Aberdeenshire; 5th May 1910; crop: 287 grains of corn, 9 sprouted; 395 grains of barley, 50 sprouted; 3 leaves of clover (*Trifolium* sp.); 1 pea; 25 stones; stomach about half full: whole content, remains of corn and barley grains.
9. Male; Strathdon, Aberdeenshire; 6th May 1910; crop almost empty: 209½ grains of barley, 29 sprouted; stomach full: husks and fragments of barley; 16 whole grains; stones.
10. Male; Straloch, Aberdeenshire; 16th May 1910; crop injured by shot: only a few grains of barley and of corn left; stomach full: 5 barley grains, 1 sprouted; 2 corn grains, 1 sprouted; husks and fragments of grains of corn and barley; stones.
11. Male; Locality (?); 1st June 1910; crop destroyed by shot: 10 corn grains; 19 peas, 3 sprouted (*Pisum arvense*); 5 seeds (*Brassica* sp.); stomach about half full: 4 peas, 1 sprouted; husks of corn; grass; stones.

Summary:—9 contained corn; 4, barley; 3, turnip tops; 3, peas; 1, beans; 2, beech nuts; 6, weeds (leaves and seeds); 1, holly seeds.

ROCK-DOVE (*Columba livia*, J. F. Gmelin).

1. Sex (?); Shetland; 8th February 1910; crop: tubes of *Spirorbis* sp.; eggs and egg-cases of the buckie (*Buccinum undatum*); fragments of seaweed; large number of seeds of orache, 2 species (*Atriplex babingtonia*, A., probably *patula*); stomach full: many fragments of seeds of orache (*Atriplex* sp.); a few seeds of goose-grass (*Galium aparine*); stones.

2. Sex (?); Loirston, Kincardineshire; 21st November 1910; crop: 21 whole and 13 pieces of small potatoes; 128 seeds of charlock (*Brassica sinapis*); 1 seed of orache (*Atriplex*, probably *patula*); 9 egg-cases (*Nassa*, probably *incrassata*); stomach full: content chiefly stones; 4 seeds of charlock (*B. sinapis*); fragments of a few grain husks.

Summary:—1 contained worm-tubes; 2, egg-cases of molluscs; 2, seeds of weeds; 1, seaweed; 1, potato; 1, grain.

RED GROUSE (*Lagopus scoticus*, Latham).

1. Female; Aboyne, Aberdeenshire; 11th November 1909; crop: filled with corn; a few leaves of sheep-sorrel (*Rumex acetosella*); stomach full: packed with corn and stones in almost equal proportion.
2. Male; Huntly, Aberdeenshire; 20th April 1910; stomach full: packed with tips of branches of ling heather (*Calluna vulgaris*); stones.
3. Male; Huntly, Aberdeenshire; 20th April 1910; crop: 1 corn grain; a few pieces of heather (*Calluna vulgaris*); stomach full: packed with tips of branches of heather (*C. vulgaris*); stones.
4. Male; Cluny, Aberdeenshire; 5th September 1910; crop: 131 corn grains; 9 tips of branches of heather (*Erica* sp.); stomach full: packed with husks and fragments of corn grains; a few fragments of heather (*Erica* sp.); stones.
5. Male; Cluny, Aberdeenshire; 5th September 1910; crop: 15 small pieces of heather (*Erica* sp.); stomach full: pieces of heather (*Erica* sp.); stones.

Summary:—3 contained grain; 3, heather; 1, leaves of weed.

PTARMIGAN (*Lagopus mutus*, Montin).

1. Male; Glen Lyon, Perthshire; 5th January 1910; crop: young shoots and a few leaves of blaeberry (*Vaccinium myrtillus*); stomach full: packed with fragments of blaeberry plants; stones.

Summary:—Contained fragments of blaeberry plants.

PHEASANT (*Phasianus colchicus*, Linn.).

1. Male; Locality (?); 15th November 1909; stomach full: corn grains; grass; seeds, probably central parts of fruits of birch (*Betula* sp.) or alder (*Alnus* sp.); stones.
2. Male; Glen Lochy, Perthshire; 5th January 1910; stomach full: seeds of hawthorn (*Crataegus* sp.); roots and tubers of the roots of lesser celandine (*Ranunculus ficaria*); stones; sand.
3. Male; Locality (?); 5th January 1910; crop full: Indian corn; stomach full; Indian corn; stones.
4. Male; Aberdeenshire; 16th April 1910; crop: 287 corn grains, 25 sprouted; stomach full: packed with husks and fragments of corn grains; 7 whole grains; stones.

Summary:—2 contained grain; 1, Indian corn; 2, seeds; 1, roots. No. 3 had probably been fed.

PARTRIDGE (*Perdix cinerea*, Latham).

1. Male; Locality (?); 5th November 1909; stomach full: grass of two kinds (*Poa trivialis*, *Aira caespitosa*); small pieces of quartz.
2. Male; Auldearn, Nairnshire; 20th January 1910; stomach about quarter full: grass (*Poa* sp.); 1 seed (*Polygonum* sp.); stones.

3. Female ; Auldearn, Nairnshire ; 20th January 1910 ; crop full : grass (*Aira cæspitosa*) ; clover leaves (*Trifolium* sp.) ; seeds of buttercup (*Ranunculus acris*) ; stomach almost empty : grass (*Aira cæspitosa*) ; stones.
4. Male ; Aboyne, Aberdeenshire ; 4th February 1910 ; crop full : 34 grains of corn, majority sprouted ; clover leaves (*Trifolium* sp.) ; a few leaves of lady's-mantle (*Alchemilla vulgaris*) ; leaves and heads of shoots of stone bedstraw (*Galium saxatile*) ; a few spurrey seeds (*Spergula arvensis*) ; stomach full : 5 sprouted corn grains and husks and fragments of grain ; clover leaves ; leaves of stone bedstraw ; a few spurrey seeds ; stones.

Summary :—3 contained grass ; 1, corn ; 3, leaves and seeds of weeds.

CORNCRAKE (*Crex pratensis*, Bechstein).

1. Male ; Lynturk, Alford, Aberdeenshire ; 15th August 1910 ; stomach about half full : remains of the heads of 3 weevils ; many fragments of chitin ; eggs of daddy-longlegs (*Tipula* sp.) ; stones.

WATER-HEN (*Gallinula chloropus*, Linn.).

1. Female ; New Deer, Aberdeenshire ; 19th November 1909 ; stomach full : fragments of corn grains ; grass ; stones.
2. Female ; Auldearn, Nairnshire ; 1st December 1909 ; stomach full : grass (*Aira cæspitosa*) ; sand.
3. Sex (?) ; Auldearn, Nairnshire ; 1st December 1909 ; stomach full : grass (*Aira cæspitosa*) ; 1 ear of corn and 2 corn grains ; seeds of knot-grass (*Polygonum aviculare*) ; sand.
4. Male ; Mintlaw, Aberdeenshire ; 17th January 1910 ; stomach full : grass (*Aira cæspitosa*) ; gravel.
5. Male ; Aberdeen ; 9th February 1910 ; stomach full : grass ; bulk of content was stones.
6. Female ; Elgin, Morayshire ; 3rd March 1910 ; stomach full : content chiefly grass (*Poa trivialis*) ; 3 whole and fragments of corn grains ; sand.
7. Female ; Elgin, Morayshire ; 9th March 1910 ; stomach full : grass (*Aira cæspitosa*) ; sand.

Summary :—7 contained grass ; 3, corn ; 1, seeds of a weed.

COOT (*Fulica atra*, Linn.).

1. Female ; Kennethmont, Aberdeenshire ; 22nd March 1910 ; stomach empty of food : a large quantity of quartz and small stones.

DOTTEREL (*Endromias morinellus*, Linn.).

1. Female ; Newburgh, Aberdeenshire ; 11th August 1910 ; stomach about quarter full : fragments of mussel shells ; sand.
2. Female ; Newburgh, Aberdeenshire ; 17th August 1910 ; stomach about quarter full : fragments of mussel shells ; sand.

Summary :—2 contained shells.

RINGED PLOVER (*Ægialitis hiaticola*, Linn.).

1. Female ; Donmouth, Aberdeen ; 26th August 1910 ; stomach almost empty : a few fragments of chitin.

2. Female; Donmouth, Aberdeen; 26th August 1910; stomach about quarter full: remains of heads of 3 weevils; fragments of chitin; stones.

Summary:—1 contained insects of injurious group; 2, chitin.

GOLDEN PLOVER (*Charadrius pluvialis*, Linn.).

1. Male; Strachan, Aberdeenshire; 26th November 1909; stomach full: remains of 1 caterpillar (?); larvæ (*Diptera*); 1 ant (*Formicidæ*); 1 beetle (*Notiophilus biguttatus*); 1 weevil (*Sitones tibialis*); 6 valves of a mollusc (*Cyclas* sp.); 1 seed (*Polygonum* sp.); grass; stones.
2. Male; Strachan, Aberdeenshire; 26th November 1909; stomach full: 1 caterpillar and remains of several (*Agrotis* sp.); remains of grey slugs (*Limax agrestis*); 2 shells (*Vitrina pellucida*); larvæ (*Diptera*); grass; stones.
3. Sex (?); Shetland; 10th February 1910; stomach about half full: 17 small molluscs (*Littorina*, probably *obtusata*); 1 mollusc (*Rissoa atella*); remains of small crustacea (*Isopoda*); stones.

Summary:—2 contained larvæ; 1, insects of injurious group; 1, beneficial group; 3, molluscs; 2, grass; 1, seed.

LAPWING (*Vanellus vulgaris*, Bechstein).

1. Male; Newburgh, Aberdeenshire; 19th November 1909; stomach almost empty: a few husks of wheat; fragments of chitin; stones and sand.
2. Male; Elgin, Morayshire; 9th March 1910; stomach about half full: 4 leather jackets (*Tipulidæ*); 1 larva (*Coleoptera*); 1 larva (*Diptera*); remains of the head of a beetle; stones and sand.
3. Female; Nottingham; 17th March 1910; stomach almost empty: a few fragments of grass; stones.
4. Male; Nottingham; 17th March 1910; stomach empty.
5. Female; Locality (?); 18th August 1910; stomach about half full: remains of 3 earth-worms; 1 wire-worm; seeds—spurrey (*Spergula arvensis*), buttercup (*Ranunculus repens*), knot-grass (*Polygonum aviculare*); fragments of grass and moss; stones.
6. Male; Cluny, Aberdeenshire; 24th August 1910; stomach almost empty: 188 eggs of an insect (*Tipula* sp.); stones.
7. Female; Aberdeen; 18th November 1910; stomach about half full: content chiefly stones; 1 weevil (*Otiorrhynchus picipes*); remains of larvæ of 2 ground beetles (*Carabidæ*).

Summary:—4 contained insects of injurious group; 1, grain; 1, seeds of weeds; 2, grass.

OYSTER-CATCHER (*Hematopus ostralegus*, Linn.).

1. Female; Loch Sunart, Argyleshire; 22nd February 1910; stomach almost empty: fragments of limpet shells; sand.

WOODCOCK (*Scolopax rusticula*, Linn.).

1. Female; Glen Lyon, Perthshire; 22nd March 1910; stomach almost empty: 1 raspberry seed (*Rubus idæus*), probably taken accidentally; stones.

SNIPE (*Gallinago caelestis*, Frenzel).

1. Female ; Locality (?) ; 24th November 1909 ; stomach almost empty : a few fragments of chitin ; grass ; stones.
2. Female ; Auldearn, Nairnshire ; 27th December 1909 ; stomach almost empty : larvæ (*Diptera*) ; remains of heads of 3 beetles (*Staphylinidæ*) ; sand.
3. Male ; Auldearn, Nairnshire ; 29th December 1909 ; stomach about quarter full : achene of buttercup (*Ranunculus* sp.) ; roots of grass ; a few husks of grain ; fragment of a beetle ; sand.
4. Female ; Clatt, Aberdeenshire ; 26th January 1910 ; stomach almost empty : a few fragments of chitin ; stones.

Summary :—4 contained insect remains ; 1, larvæ ; 2, grass ; 1, grain ; 1, seeds.

DUNLIN (*Tringa alpina*, Linn.).

1. Female ; Belhelvie, Aberdeenshire ; 12th August 1910 ; stomach filled with sand.
2. Male ; Belhelvie, Aberdeenshire ; 12th August 1910 ; stomach half filled with sand : remains of the shell of a land snail.
3. Female ; Belhelvie, Aberdeenshire ; 12th August 1910 ; stomach half filled with sand : remains of the shell of a land snail.
4. Female ; Newburgh, Aberdeenshire ; 23rd August 1910 ; stomach almost empty : remains of a small shrimp (?) ; head of a weevil (?) ; sand.
5. Female ; Donmouth, Aberdeen ; 26th August 1910 ; stomach empty : fragment of a beetle.
6. Male ; Donmouth, Aberdeen ; 26th August 1910 ; stomach almost empty : 15 eggs of insect (*Tipula* sp.) ; sand.
7. Female ; Donmouth, Aberdeen ; 26th August 1910 ; stomach almost empty : 1 beetle (*Helophorus rugosus*) ; sand.

Summary :—1 contained insects of injurious group ; 1, indifferent group ; 2, snails ; 1, crustacea ; 1, eggs of an insect.

PURPLE SANDPIPER (*Tringa striata*, Linn.).

1. Male ; Loch Sunart, Argyleshire ; 21st January 1910 ; stomach about quarter full : 11 molluscs (small periwinkle *Littorina*, probably *rudis*) ; 3 amphipods (*Orchestia* sp.) ; sand.
2. Female ; Nigg, Kincardineshire ; 3rd March 1910 ; stomach full : content chiefly fragments of mussel ; 5 young molluscs (1 *Littorina* sp., 4 *Purpura lapillus*) ; 2 isopods (*Idotea granulosa*, *Idotea* sp.) ; sand.
3. Male ; Nigg, Kincardineshire ; 3rd March 1910 ; stomach full : content chiefly fragments of mussel ; 14 young molluscs (13 *Littorina* sp., 1 *Purpura* sp.) ; 1 amphipod (*Orchestia* sp.) ; sand.
4. Female ; Nigg, Kincardineshire ; 3rd March 1910 ; stomach about half full : 2 young molluscs (1 *Littorina* sp., 1 *Purpura* sp.) ; crustacea (2 *Idotea tricuspidata*, *Podocerus capillatus*) ; fragments of mussels ; sand.

Summary :—4 contained molluscs ; 4, crustacea.

RUFF (*Machetes pugnax*, Linn.).

1. Male ; Newburgh, Aberdeenshire ; 17th August 1910 ; stomach about half full : 3 seeds of sorrel (*Rumex acetosa*) ; 21 pieces of skins of caterpillars (?) ; part of head of a weevil ; stones.

Summary :—Contained insect of injurious group.

REDSHANK (*Totanus calidris*, Linn.).

1. Female; Loch Sunart, Argyleshire; 15th February 1910; stomach almost empty: fragments of a few larvæ (?); sand.
2. Male; Loch Sunart, Argyleshire; 15th February 1910; stomach empty.
3. Male; Newburgh, Aberdeenshire; 24th August 1910; stomach almost empty: remains of a small crab; 1 beetle (*Helophorus rugosus*); 2 eggs of insects (*Tipula* sp.); stones.
4. Male; Newburgh, Aberdeenshire; 24th August 1910; stomach almost empty: head and part of wing of an insect (*Tipula* sp.); sand.

Summary:—1 contained larvæ; 1, insect of beneficial group; 1, injurious group; 1, crab.

CURLEW (*Numenius arquata*, Linn.).

1. Female; Nigg, Kincardineshire; 27th April 1910; stomach quite empty.
2. Female; Nigg, Kincardineshire; 27th April 1910; stomach almost empty: a few fragments of green seaweed (*Ulva*).
3. Female; Ythanmouth, Newburgh, Aberdeenshire; 23rd August 1910; stomach about half full: almost the whole content was remains of skins of leather jackets (*Tipulidæ*); head of 1 caterpillar; head and 1 elytron of a beetle (*Pterostichus* sp.); wing of an insect (*Tipula* sp.); sand.

Summary:—1 contained insects of the injurious group; 1, beneficial group.

COMMON TERN (*Sterna fluviatilis*, Naumann).

1. Male; Belhelvie, Aberdeenshire; 8th August 1910; stomach about half full: remains of a small fish (?); fish scales; sand.

BLACK-HEADED GULL (*Larus ridibundus*, Linn.).

1. Female; Locality (?); 7th February 1910; stomach very full: packed with discoloured corn grains, more than half of which had sprouted; stones.
2. Female; Locality (?); 27th May 1910; stomach almost empty: fish remains; vertebrae and muscle.
3. Male; Belhelvie, Aberdeenshire; 8th August 1910; stomach almost empty: 2 small pieces of grass; a small pellet of hair; stones.
4. Male; Balgownie, Aberdeenshire; 10th August 1910; stomach full: 4 insects (*Tipula cornicina*); remains of 4 marine worms; 4 whole eels and remains of 4, 69 to 80 mm. in length (*Anguilla vulgaris*); 15 amphipods (*Gammarus marinus*); a large number of eggs of an insect (*Tipula* sp.); grass; stones.
5. Female; Balgownie, Aberdeenshire; 22nd August 1910; stomach almost empty: 28 eggs of an insect (*Tipula* sp.); fragments of chitin; sand.
6. Female; Balgownie, Aberdeenshire; 22nd August 1910; stomach almost empty: remains of 2 small shrimps (?); remains of heads of 2 weevils; a few eggs of an insect (*Tipula* sp.); stones.
7. Female; Balgownie, Aberdeenshire; 22nd August 1910; stomach about one-quarter full: remains of heads of 10 weevils; a few eggs of an insect (*Tipula* sp.); stones and sand.

8. Female; Balgownie, Aberdeenshire; 22nd August 1910; stomach about quarter full: seeds—spurrey (*Spergula arvensis*, var. *sativa*); remains of head of weevil; large number of eggs of insect (*Tipula* sp.); stones.
9. Male; Balgownie, Aberdeenshire; 23rd August 1910; stomach half full: insects—remains of daddy-longlegs (*Tipula* sp.); fragment of wing of an insect (*Diptera*); 1 small shrimp and remains of another (*Crangon vulgaris*); remains of 2 larvæ (*Diptera*); a few eggs of an insect (*Tipula* sp.).
10. Male; Balgownie, Aberdeenshire; 23rd August 1910; stomach quarter full: remains of 1 shrimp (*Crangon* sp.); fragment of a beetle (?); 1 insect (*Tipula oleracea*); seeds—buttercup (*Ranunculus repens*), knot-grass (*Polygonum aviculare*); stones.
11. Female; Balgownie, Aberdeenshire; 23rd August 1910; stomach half full: seeds—Buttercup (*Ranunculus repens*), chickweed (*Stellaria media*), spurrey (*Spergula arvensis*, var. *sativa*), probably clover (*Trifolium* sp.; grass; remains of earth-worms; fragments of chitin; a few eggs of insect (*Tipula* sp.); stones.
12. Female; Balgownie, Aberdeenshire; 23rd August 1910; stomach almost empty: seeds—probably crowberry (*Empetrum nigrum*), spurrey (*Spergula arvensis*), dock (*Rumex* sp.); a few eggs of insect (*Tipula* sp.); stones.
13. Male; Balgownie, Aberdeenshire; 1st September 1910; stomach about half full: bulk of content was remains of earth-worms; grass; small pieces of moss; seeds of the sheep-sorrel (*Rumex acetosella*); stones.
14. Male; Balgownie, Aberdeenshire; 1st September 1910; stomach about three-quarters full: bulk of content was remains of earth-worms; remains of head of 1 weevil; 1 insect (*Tipula oleracea*); grass; small pieces of moss; seeds—sheep-sorrel (*Rumex acetosella*), bird's-foot trefoil (*Lotus corniculatus*), achene of a buttercup (*Ranunculus* sp.); stones.
15. Female; Balgownie, Aberdeenshire; 1st September 1910; stomach full: bulk of content was remains of earth-worms; remains of an insect (*Tipula* sp.); small pieces of moss; grass; seeds of the sheep-sorrel (*Rumex acetosella*); stones.
16. Male; Balgownie, Aberdeenshire; 1st September 1910; stomach full: bulk of content was daddy-longlegs; 47 (*Tipula oleracea*) remains of an insect (*Cælopa*, probably *frigida*); remains of earth-worms; sand.
17. Male, Balgownie, Aberdeenshire; 1st September 1910; stomach about quarter full: remains of earth-worms; seeds—spurrey (*Spergula arvensis*, var. *sativa*), knot-grass (*Polygonum aviculare*), knawel (*Scleranthus annuus*); stones.
18. Male; Balgownie, Aberdeenshire; 1st September 1910; stomach about quarter full: remains of earth-worms; remains of insects (*Tipula* sp.); seeds—mouse-ear chickweed (*Cerastium triviale*), spurrey (*Spergula arvensis*); stones.
19. Female; Belhelvie, Aberdeenshire; 20th October 1910; stomach almost empty: 2 fragments of a worm-tube, 23 mm. and 12 mm. long respectively; 2 otoliths; fish-bones; sand.
20. Female; Aberdeen; 23rd November 1910; stomach about three-quarters full: bulk of content was remains of earth-worms; seeds—sheep-sorrel (*Rumex acetosella*), (*Polygonum* sp.).

Summary.—12 contained insects of the injurious group, or their eggs; 1, marine-worms; 8, earth-worms; 1, worm-tube; 3, fish; 3, crustacea 12, grass and seeds.

COMMON GULL (*Larus canus*, Linn.).

1. Male; Portree, Skye; 28th February 1910; stomach almost empty: a few small pieces of grass; earth.
2. Female; Newtonhill, Kincardineshire; 24th August 1910; stomach full: insects—58 daddy-longlegs (*Tipula oleracea*); head of 1 beetle (*Lamellicornia*); fish vertebrae; small quantity of bread.
3. Male; Balgownie, Aberdeenshire; 1st September 1910; stomach empty: 1 otolith of fish.
4. Female; Balgownie, Aberdeenshire; 1st September 1910; stomach empty.

Summary:—1 contained insects of the injurious group; 1, indifferent group; 2, fish; 1, bread; 1, grass.

HERRING GULL (*Larus argentatus*, J. F. Gmelin).

1. Sex (?); Locality (?); 10th November 1909; stomach about half full: grass; husks of corn grains; fragments of acorn shells; fragments of mussel shells; amphicoelus vertebrae.
2. Female; Donmouth, Aberdeen; 17th November 1909; stomach full: filled with corn, some grains sprouted; some fish remains; grass.
3. Male; Aberdeen; 22nd November 1909; stomach about half full: cinders; some pieces of decayed fish (probably feeding on a refuse heap).
4. Female; Auldearn, Nairn; 30th December 1909; stomach full: fish remains; remains of a small mammal (probably a rat).
5. Female; Donmouth, Aberdeen; 19th January 1910; stomach empty: a few fragments of fish-bone.
6. Sex (?); Mintlaw, Aberdeenshire; 28th January 1910; stomach full: decayed flesh (probably of a sheep); wool of a sheep.
7. Male; Brora, Sutherlandshire; 9th February 1910; stomach about half full: bones of the heads of two fishes (probably haddock); broken shells (*Macra stultorum*).
8. Male; Aberdeen; 23rd July 1910; stomach quite empty.
9. Male; Belhelvie, Aberdeenshire; 8th August 1910; stomach about half full: remains of small crab (*Portunus* sp.); 1 valve of mussel shell (*Mytilus edulis*); 1 whole acorn shell and remains of several (*Balanus* sp.); fragments of shells; sand; a few husks of grain.
10. Male; Belhelvie, Aberdeenshire; 8th August 1910; stomach about three-quarters full; broken mussel shells; sand.
11. Male; Belhelvie, Aberdeenshire; 8th August 1910; stomach full: 2 swimming crabs (*Portunus* sp.); 1 shrimp (*Crangon vulgaris*); fragments of shells; sand.
12. Female; Belhelvie, Aberdeenshire; 12th August 1910; stomach full: packed with remains of large earth-worms; 3 whole and remains of 2 daddy-longlegs (*Tipula oleracea*); grass; clover leaves (*Trifolium* sp.); 17 seeds of spurrey (*Spergula arvensis*); earth; stones.
13. Female; Belhelvie, Aberdeenshire; 12th August 1910; stomach almost empty: a few grain husks; 1 seed (*Caryophyllaceae*).
14. Female; Belhelvie, Aberdeenshire; 13th August 1910; stomach about quarter full: content chiefly grass; 2 seeds—1 spurrey *Spergula arvensis*, var. *sativa*, 1 achene of a buttercup (probably *Ranunculus acris*); sand and stones.
15. Female; Donmouth, Aberdeen; 13th August 1910; stomach very full: pieces of bread, of cheese, of meat, of raw potato, of newspaper; stones.

16. Female ; Newtonhill, Kincardineshire ; 17th August 1910 ; stomach full : filled with fish remains (probably haddock) ; a few blades of grass.
17. Male ; Newtonhill, Kincardineshire ; 18th August 1910 ; stomach about half full : 17 small mussels (*Mytilus edulis*) ; fish remains ; grass ; straw ; stones.
18. Female ; Newtonhill, Kincardineshire ; 18th August 1910 ; stomach about quarter full : seeds—knotgrass (*Polygonum aviculare*), spurrey (*Spergula arvensis*, var. *sativa*), buttercup (*Ranunculus*, probably *repens*), probably ovaries of a grass ; straw ; wings of an insect ; stones.
19. Male ; Belhelvie, Aberdeenshire ; 22nd August 1910 ; stomach about quarter full : fruit remains and seeds of the wild rose (*Rosa* sp.).
20. Male ; Newtonhill, Kincardineshire ; 25th August 1910 ; stomach almost empty : a few fish-bones ; stones.
21. Male ; Newtonhill, Kincardineshire ; 25th August 1910 ; stomach almost empty : a few fish-bones ; eggs of an insect (*Tipula* sp.) ; broken seed-coat of a spurrey seed (*Spergula arvensis*).
22. Male ; Donmouth, Aberdeen ; 25th August 1910 ; stomach about half full : chiefly filled with decayed flesh (?) ; grass ; sand.
23. Male ; Balgownie, Aberdeenshire ; 31st August 1910 ; stomach empty.
24. Female ; Cove, Kincardineshire ; 2nd September 1910 ; stomach about one-third full : fish-bones ; otoliths of fish (?).
25. Male ; Cove, Kincardineshire ; 2nd September 1910 ; stomach full : decomposed fish remains ; bread ; stones.
26. Female ; Cove, Kincardineshire ; 2nd September 1910 ; stomach about half full : lime picked from a wall ; remains of an insect (*Muscida*, *Calliphora* sp.) ; a small mussel (*Mytilus edulis*).
27. Female ; Cove, Kincardineshire ; 3rd September 1910 ; stomach quite empty.
28. Female ; Cove, Kincardineshire ; 3rd September 1910 ; stomach about half full : content chiefly pieces of potato ; grass ; fish vertebræ ; stones.
29. Male ; Cove, Kincardineshire ; 3rd September 1910 ; stomach very full : head of a herring ; piece of a haddock ; large piece of fat (probably feeding on refuse).
30. Female ; Aberdeen ; 4th September 1910 ; stomach almost empty : grass ; a few stones.
31. Female ; Belhelvie, Aberdeenshire ; 17th October 1910 ; stomach full : large pieces of potato ; 2 grains of barley ; 33 mussels (*Mytilus edulis*) ; stones.
32. Male ; Belhelvie, Aberdeenshire ; 17th October 1910 ; stomach full ; part of a large mammalian vertebra ; pieces of cooked meat ; decayed head of a haddock ; pieces of fat ; cinders.
33. Female ; Belhelvie, Aberdeenshire ; 17th October 1910 ; stomach almost empty : fragments of mussel shells ; a few fish vertebræ ; fragments of an otolith ; husks of grain.
34. Male ; Belhelvie, Aberdeenshire ; 19th October 1910 ; stomach full : 300 barley grains ; fragments and husks of grain ; grass.
35. Male ; Belhelvie, Aberdeenshire ; 19th October 1910 ; stomach about half full : fish remains ; otoliths (probably of cod) ; fragments of shells ; 1 whole shell (*Lacuna pallidula*).
36. Male ; Belhelvie, Aberdeenshire ; 19th October 1910 ; stomach almost empty : a few fish vertebræ ; fragments of acorn shells.
37. Female ; Nigg, Kincardineshire ; 20th October 1910 ; stomach almost empty : 5 stones ; a small piece of coarse cloth ; sand.

38. Male; Balgownie, Aberdeenshire; 31st October 1910; stomach empty: a piece of a twig, 12 mm. long, diameter 2 mm., the end sticking into the lining of the stomach wall.
39. Male; Donmouth, Aberdeen; 31st October 1910; stomach about quarter full: fragments and husks of grain; fragments of chitin; forceps of an earwig (*Forficulidae*); grass.
40. Female; Loirston, Kincardineshire; 4th December 1910; stomach about quarter full: claws of a small crab; small dog whelk (*Purpura lapillus*); fragments of shells; husks of grain; grass.
41. Female; Elgin, Morayshire; 8th December 1910; stomach quite empty.
42. Male; Balmedie, Aberdeenshire; 12th December 1910; stomach about half full: content chiefly grass; 4 seeds—1 spurrey (*Spergula arvensis*), 1 chickweed (*Stellaria media*), 1 mouse-ear chickweed (*Cerastium triviale*), 1 achene of a buttercup (*Ranunculus repens*); 1 otolith of a fish; broken shells and sand.
43. Female; Balmedie, Aberdeenshire; 12th December 1910; stomach full: content chiefly grass; seeds—73 spurrey (*Spergula arvensis*), 1 (*Polygonum*, probably *aviculare*); remains of 1 earth-worm; remains of 1 brittle star (*Ophiopholis*); 2 otoliths of fish (probably cod); stones and sand.
44. Male; Balmedie, Aberdeenshire; 13th December 1910; stomach about half full: content chiefly grass; seeds—8 fruits of the marsh thistle (*Cnicus palustris*); 2 barley grains.

Summary:—15 contained fish; 3, carrion; 13, shells; 4, refuse; 1, brittle star; 4, crustacea; 3, insects of injurious group; 2, indifferent group; 3, earth-worms; 3, potatoes; 9, grain; 14, grass; 9, seeds.

GREAT BLACK-BACKED GULL (*Larus Marinus*, Linn.).

1. Male; Belhelvie, Aberdeenshire; 31st October 1910; stomach about quarter full: remains of fish, muscle and vertebræ; sand.
2. Male; Balmedie, Aberdeenshire; 12th December 1910; stomach almost empty: a few fragments of thick fleshy leaves (?); sand.
3. Male; Balmedie, Aberdeenshire; 13th December 1910; stomach about half filled with decomposed vegetable matter.
4. Male; Balmedie, Aberdeenshire; 14th December 1910; stomach quite empty.
5. Male; Balmedie, Aberdeenshire; 14th December 1910; stomach almost empty: a few fragments of grain husks.
6. Male; Balmedie, Aberdeenshire; 14th December 1910; stomach full: filled with the hair of a small mammal (probably a rat).

Summary:—1 contained fish; 1, hair; 3, vegetable matter.

RAZORBILL (*Alca torda*, Linn.).

1. Male; Locality (?); 13th June 1910; stomach empty.
2. Male; Balgownie, Aberdeenshire; 31st October 1910; stomach empty.

GUILLEMOT (*Uria troile*, Linn.).

1. Male; Corbie Loch, Aberdeenshire; 13th December 1909; stomach empty.
2. Male; Stonehaven, Kincardineshire; 15th December 1909; stomach empty.
3. Male; Locality (?); 1st November 1910; stomach empty.

PUFFIN (*Fratercula arctica*, Linn.).

1. Female ; Aberdeen ; 8th February 1910 ; stomach empty.
2. Female ; Locality (?) ; 13th June 1910 ; stomach empty.

GREAT NORTHERN DIVER (*Colymbus glacialis*, Linn.).

1. Female ; Lossiemouth, Morayshire ; 26th October 1910 ; stomach quite empty.
2. Male ; Scalloway, Shetland ; 25th November 1910 ; stomach about half full : vertebra and muscle of fish ; stones.

Summary :—1 contained fish.

RED-THROATED DIVER (*Colymbus septentrionalis*, Linn.).

1. Male ; Rattray, Aberdeenshire ; 26th October 1910 ; stomach empty : 4 stones.

SLAVONIAN OR HORNED GREBE (*Podiceps auritus*, Linn.).

1. Male ; Shetland ; 20th November 1909 ; stomach about half full : remains of several small fishes ; some down feathers ; fragments of several small crustaceans. As the fish were disintegrated, the crustacea may have come from them.

Summary :—Contained fish.

THE CHEMICAL COMPOSITION OF FARMYARD MANURE AS A MEASURE OF ITS VALUE.

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INTRODUCTION.

THE investigations of recent years upon the action of manures have demonstrated clearly that this action is, in all cases, more than a mere supplying of food-ingredients to the plant. In most cases this direct effect is apparently the predominant one, but in others it is largely modified, often even overshadowed, by more indirect effects arising out of the influence of the manure upon such factors as the texture of the soil, its power of retaining moisture, or the activity of micro-organisms contained in it. These indirect effects are especially significant in the case of manures composed of animal or vegetable matters, and above all, in the case of farmyard manure. No other material is used in such large quantities or exercises such a profound influence

upon the general character of the soil, so that the assessment of its value is a matter of the utmost practical importance.

It is the universal practice amongst agricultural chemists and others in valuing manures to assume that the value of a manure is directly determined by its power to supply the plant with food, and to calculate its value accordingly from its chemical composition, making due allowance for such factors (*e.g.*, fineness of grinding) as obviously affect the ease of transference of the nutrients to the plant. The method is primarily adapted for application to the manures of mineral origin (nitrate of soda, potash manures, etc.) whose indirect effects upon fertility are, in general, small in comparison with their direct effect in supplying plant-food. For the reasons outlined above it is more open to criticism when applied to organic manures, and most of all when used for the valuation of farmyard manure.

The relation between the chemical composition of farmyard manure and its value in the field has been the subject of numerous experiments in various parts of the world, and although the results are conflicting, their general trend is to indicate that the chemical composition alone is far from being a safe criterion of the value of farmyard manure.

The experiments described in the following pages deal with the same problem and lead to similar conclusions, so that they are novel neither in conception nor outcome. They are not yet completed, but we feel that a summary of the results thus far obtained may serve as a useful supplement to articles dealing with the connection between food and manure that have appeared in the last two volumes of the 'Transactions.'¹

Our investigations have been associated with two bullock-feeding trials that were carried out under the supervision of Prof. R. S. Seton in the winters of 1908-9 and 1909-10 at the Manor Farm, Garforth, near Leeds.² The object of these trials was to compare a ration including a heavy allowance of roots and a moderate allowance of concentrated foods with another ration including a moderate allowance of roots and a high allowance of concentrated foods. The foods used were precisely the same in each ration, the difference simply being in the relative proportions of roots and concentrated foods.

It appeared to us that the manure produced by these animals would furnish useful material for experiment upon the question outlined in the title of this communication, since the two lots of manure, although differing in percentage composition, would be made up of precisely identical chemical compounds. In all

¹ Crowther, Trans. 1910, p. 125; Hendrick, Trans. 1911, p. 82.

² Experimental Farm of the University of Leeds and the Yorkshire Council for Agricultural Education.

other respects they would presumably be as nearly alike as possible. It was also of interest to ascertain, if possible, to what extent the theoretical difference in "manure value" between the two rations could be actually recovered in crop increases.

In the following pages we have summarised the essential features and results of the feeding-trials, the composition of the different lots of manure produced, and their effects upon crops as tested by field-trials.

Bullock-Feeding Experiment, 1908-9.

For the purposes of this experiment eighteen Irish bullocks, of weights ranging from 8 cwt. 1 qr. 10 lb. to 9 cwt. 2 qrs. 8 lb., were purchased on October 22, 1908, at York. Of these, fourteen were subsequently selected and divided into two groups for the experiment, which commenced on November 15, 1908. The bullocks were sold on March 22, 1909, so that the experiment extended over 18 weeks.

The animals were kept under cover and received throughout the whole of this period rations consisting of turnips, straw, crushed oats, and linseed-cake. During the first eight weeks decorticated cotton-seed meal was also included in the rations.

The allowance of straw was always the same for each group, but Group I. ("Moderate Feed") received a liberal allowance of roots (112 lb.) and a moderate allowance of concentrated foods (4-7 lb.), whilst Group II. ("High Feed") received a moderate allowance of roots (70 lb.) along with a liberal allowance of concentrated foods (8-14 lb.). The scheme of the experiment will be clear from the schedule on page 222.

The average increases in live-weight per head for the whole period of the experiment were—

Group I.	.	.	.	214 lb. $\pm$ 15 lb. (=1.70 lb. per day)
" II.	.	.	.	237 " $\pm$ 16 " (=1.88 " " ")

The more richly fed bullocks thus made practically no greater gain in live-weight than those of Group I. The difference in the cost of feeding for the whole period was estimated to be 24s. per head. The question as to the comparative merits of the two rations thus turned almost entirely upon the value of the dung produced.

Manure-Values of Rations.

The weights of foods consumed by each group and the estimated values (at the time of application in the field) of the

DAILY RATIONS PER HEAD.

GROUP I. (MODERATE FEED).

	FIRST PERIOD.	SECOND PERIOD.	THIRD PERIOD.	FOURTH PERIOD.
	Nov. 15, '08- Jan. 11, '09 (8 weeks).	Jan. 12-Feb. 7 (4 weeks).	Feb. 8-March 7 (4 weeks).	March 8-22 (2 weeks).
	lb.	lb.	lb.	lb.
Roots . . .	112	112	112	112
Chopped straw	7	7	7	7
Long straw .	8	8	8	8
Crushed oats .	2	2	3*	3
Linseed-cake .	1	2	3*	4
Decort. cotton- seed meal }	1	...	...	...

GROUP II. (HIGH FEED).

Roots . . .	70	70	70	70
Chopped straw	7	7	7	7
Long straw .	8	8	8	8
Crushed oats .	4	6	6	6
Linseed-cake .	2	4	6	8
Decort. cotton- seed meal }	2	...	...	...

* From Feb. 14.

manurial ingredients derived therefrom are given in the following table. The manure-values per ton used in the calculation

	GROUP I. (Moderate Feed).				GROUP II. (High Feed).			
	Weight of Food consumed.	Value of Manurial Residues.			Weight of Food consumed.	Value of Manurial Residues.		
		Per ton. ¹	Total.					
	lb.	s. d.	£ s. d.		lb.	£ s. d.		
Roots . . .	97,706	2 9	6 0 0		61,740	3 15 9		
Straw . . .	11,259	9 9	2 9 1		10,594	2 6 1		
Oats . . .	2,009	13 10	0 12 5		4,494	1 7 9		
Linseed-cake .	1,708	37 3	1 8 5		3,514	2 18 5		
Cotton-seed meal .	399	54 10	0 9 9		798	0 19 6		
Total value of manurial residues .			10 19 8			11 7 6		
Balance in favour of Group II.						0 7 10		

¹ Leaflet No. 73, issued by the University of Leeds and the Yorkshire Council for Agricultural Education.

are taken from a table compiled by one of us,¹ and agree closely with those given in Hall and Voelcker's tables, being computed on the basis suggested in their paper.² The difference between the weights of straw consumed is due to the fact that the allowance was not always completely eaten. Any residues were always collected and weighed.

The calculation shows the small balance of only 7s. 10d. in favour of the manure produced by Group II., but in view of the large surplus of roots consumed by Group I. as compared with Group II., and the consequent greater difficulties in preventing losses by drainage (see Hendrick, *loc. cit.*), it was to be expected that the manure as removed after the close of the experiment would show a greater difference in the value than this. Moreover, the extra quantity of roots consumed by Group I. involved a more liberal supply of straw for litter than was needed in the case of Group II. Consequently, although practically equal amounts of dry matter were consumed by the two groups, a rather greater quantity of manure was obtained from Group I. (43 tons) than from Group II. (40 tons).

Composition and Value of Manures.

The manure was left undisturbed in the covered yard until September 24, 1909, when samples were taken for analysis. These were obtained by cutting into the manure with a hay knife at four different places in each lot of manure, and removing from a medium depth (about 15 to 18 inches below the surface) about a cubic foot of the manure at each place. These four portions were then thrown together upon a clean floor, thoroughly teased out and mixed. Small portions were then taken from different parts of the heap thus made and placed alternately in three tin boxes, each of about 1 cubic foot capacity, the sampling being continued until each tin was filled with tightly packed manure. They were then closed and sent to the laboratory. The three samples thus obtained were passed separately through a mincing-machine set to give the finest cut, and were ultimately reduced thereby to a finely divided condition, so that there was no difficulty in drawing representative portions for the purposes of the analyses.

The results are given on page 224.

It will be noticed that, as was to be expected, the manure from Group I. was decidedly moister than that from Group II. This was very obvious in the preparation of the samples. Further, it contained only about two-thirds of the proportions of nitrogen and phosphoric acid, and four-fifths of the proportions of potash that were contained in the manure from Group

¹ Leaflet No. 73, issued by the University of Leeds and the Yorkshire Council for Agricultural Education.

² Journal, Royal Agric. Soc., vol. lxiii. (1902), p. 76.

GROUP I. (MODERATE FEED).

	Sample A.	Sample B.	Sample C.	Mean.	Probable Error of Mean.
Moisture	per cent. 81·35	per cent. 81·18	per cent. 81·40	per cent. 81·31	per cent. ±·05
Dry matter	18·65	18·82	18·60	18·69	±·05
Organic matter	14·48	14·73	14·41	14·54	±·06
Ash	4·17	4·09	4·19	4·15	±·02
Nitrogen, total	·449	·433	·441	·441	±·012
" present as ammonia	...	·086	·080	·083	±·001
Phosphoric acid (P ₂ O ₅)	·256	·236	·246	·246	±·007
Potash (K ₂ O)	·457	·526	·490	·491	±·028
Lime (CaO)	·213	·218	...	·215	±·001
Sand, &c.	2·55	2·57	2·74	2·62	±·04

GROUP II. (HIGH FEED).					
Moisture	79·11	78·59	78·98	78·89	±·11
Dry matter	20·89	21·41	21·02	21·11	±·11
Organic matter	16·04	16·77	16·25	16·46	±·15
Ash	4·85	4·64	4·77	4·75	±·04
Nitrogen, total	·629	·637	·636	·631	±·015
" present as ammonia	·187	·205	·171	·188	±·007
Phosphoric acid (P ₂ O ₅)	·366	·328	·328	·340	±·018
Potash (K ₂ O)	·577	·543	·597	·572	±·024
Lime (CaO)	·251	·265	·265	·260	±·003
Sand, &c.	2·64	2·34	2·52	2·50	±·06

II. Moreover, whereas in the latter nearly one-third of the nitrogen was present in the valuable form of ammonia, the proportion was less than one-fifth in the case of the manure from the less richly-fed bullocks (Group I.)

If we assume the nitrogen to be worth 12s. per unit,¹ phosphoric acid 3s. per unit, and potash 4s. per unit, the value per ton of each manure can be assessed as follows:—

GROUP I.			GROUP II.		
Nitrogen . .	·44 × 12s. =	5 3	Nitrogen . .	·63 × 12s. =	7 7
P ₂ O ₅ . .	·25 × 3s. =	0 9	P ₂ O ₅ . .	·34 × 3s. =	1 0
K ₂ O . .	·49 × 4s. =	2 0	K ₂ O . .	·57 × 4s. =	2 3
Total estimated value per ton 8 0			Total estimated value per ton 10 10		

¹ Good reasons might be adduced for adopting a much lower unit value for the nitrogen, but the figure taken is no more than is commonly paid in the case of other organic manures (rape meal, fish meal, etc.) If the value be placed as low even as 6s., the conclusions drawn in the following pages are not vitally affected.

Valued on this basis the manure from Group II. was worth 2s. 10d. per ton more than that from Group I.

The total weight of manure made by Group I. was 43 tons, and by Group II. 40 tons. The difference in value (estimated) between the two lots of manure was thus:—

GROUP II.—40 tons at 10s. 10d.	.	.	.	= £21 13 4
GROUP I.—43 tons at 8s.	.	.	.	= 17 4 0

This estimated difference in value of, roughly, £4, 10s. far exceeds the value calculated from the differences in the food consumed (p. 222). There must obviously have been considerable losses of manurial ingredients in the case of Group I. This is doubtless attributable to the large quantity of roots consumed and consequent great volume of urine voided.

Field Trial with Manures.

The difference in value of the two lots of manure was further tested by means of a field trial with meadow-hay. For this purpose a series of 13 plots originally marked out in 1899, but treated uniformly since 1900, was utilised. Each plot was originally $\frac{1}{20}$ acre in extent, but had been subdivided into two, thus giving 26 plots, each $\frac{1}{40}$ acre in extent. The way in which these were utilised for the purposes of the experiment with the two lots of dung is indicated below.

PLOT	1	2	3	4	5	6	7	8	9	10	11	12	13	
	RICH MANURE. (Group II.)								POOR MANURE. (Group I.)					
	POOR MANURE. (Group I.)								RICH MANURE. (Group II.)					
PLOT	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	

The dung was applied on November 15, 1909, at the rate of 8 tons per acre, the hay cut on July 14 and 15, 1910, carted and weighed on July 18, 1910.

The weights of hay obtained (expressed as crop per acre) were as follows:—

RICH MANURE—			cwt.	qr.	lb.	cwt.	qr.	lb.	Probable error.
Average of Plots 1-7 .			52	1	0				
" " 8a-13a .			39	0	12				
Average of all plots .						46	1	5	±177 lb.
POOR MANURE—									
Average of Plots 8-13 .			39	1	11				
" " 1a-7a .			47	3	23				
Average of all plots .						43	3	14	±129 lb.
Average difference to credit of Rich Dung						2	1	19	±260 lb.

The weights obtained from each of the small plots indicate that the fertility was appreciably less on plots 9-12 and 9a-12a than on the rest, but the arrangement adopted obviously made due allowance for this. It is worthy of note, however, that it was only upon the five plots 8-12 that the "poor dung" gave a yield of hay equal to or greater than that obtained upon the corresponding plots (8a-12a) dressed with "rich dung."

On the remaining eight pairs of plots there was in each case a substantial difference in favour of the rich dung.

The averages of all the plots show a difference to the credit of the richer manure of a little over 2 cwt. of hay. This is barely greater than the probable error of the experiment, as deduced from the variation between the yields from the individual $\frac{1}{16}$ acre plots, so that there is no certainty that the recorded difference was actually due to the differences in the manures.

A similar difference in crop was recorded again in the following season (1911), the plots having received no further manurial treatment beyond the grazing of the aftermath in the autumn of 1910.

The plots were cut on July 6 and carted on July 8, 1911. The weights of hay obtained (expressed as crop per acre) were as follows:—

RICH MANURE—			cwt.	qr.	lb.	cwt.	qr.	lb.	Probable error.
Average of Plots 1-7 .			39	2	22				
" " 8a-13a .			29	3	15				
Average of all plots .						35	0	18	±104 lb.
POOR MANURE—									
Average of Plots 1a-7a .			36	0	19				
" " 8-13 .			29	2	23				
Average of all plots .						33	0	21	±95 lb.
Average difference to credit of Rich Dung						1	3	25	±141 lb.

The averages thus again showed a difference of, roughly, 2 cwt. of hay per acre in favour of the richer manure, a quantity not far outside the range of the probable error of the experiment.

It is not possible, therefore, to assert definitely that the average difference recorded in each season was directly due to the difference in the manurial treatment of the two series of plots. Still, the variation from plot to plot was so strikingly similar in the two seasons as to increase greatly the probability that the differences were due largely to the manure.

If we credit the differences entirely to the manure, we see that in two seasons' hay crops the manure from Group II. (High Feed), applied at the rate of 8 tons per acre, gave 4½ cwt. per acre more hay than the manure from Group I. (Moderate Feed), applied at the same rate—or, say, ½ cwt. of hay per ton of manure. If the hay be valued at 50s. per ton, the value of 56 lb. will be 1s. 3d. Hence, as measured in this way by the increase in two years' hay crops, the "high feed" manure has given per ton a return valued at 1s. 3d. more than the "moderate feed" manure. This is barely one-half of the estimated difference in value (2s. 10d.) of the two lots of manure as calculated from their composition, and it is hardly conceivable that the difference will be made up within a reasonable period of years.¹

	RICH MANURE HAY.			POOR MANURE HAY.		
	Plots 1-7.	Plots 8a-13a.	Average.	Plots 1a-7a.	Plots 8-13.	Average.
Moisture	%	%	%	%	%	%
*True Albuminoids	9.0	7.0	8.0	9.6	9.1	9.4
"Amides"	4.9	5.4	5.1	6.1	5.9	6.0
"Oil" (Ether Extract) . . .	1.9	1.9	1.9	1.0	1.4	1.2
Crude Fibre	1.2	2.6	1.9	1.7	2.2	2.0
*Crude Ash	27.5	26.5	27.0	25.9	26.3	26.1
Soluble Carbohydrates, &c. (by difference) }	5.5	5.2	5.4	6.3	5.9	6.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
*Digestible Albuminoids ¹ . .	3.5	3.9	3.7	3.5	3.5	3.5
*Including Silica, Sand, &c. . .	1.4	1.8	1.6	1.7	1.7	1.7
" Potash (K ₂ O)	1.5	1.5	1.5	1.45	1.45	1.45
" Phosphoric Acid (P ₂ O ₅) . .	.5	.45	.48	.5	.4	.45
" Lime (CaO)	.5	.4	.45	.6	.6	.6

¹ As determined by treating the hay with an acid solution of pepsin.

¹ The conclusions arrived at in estimates of this character are, of course, greatly influenced by the price at which the crop is valued. This we think should be based rather upon the value for feeding purposes than upon market prices, and we find that the figure used is commonly accepted by farmers as fair for old land hay.

We have assumed above that there was no difference in the quality of the hay grown with the different manures, and this is borne out by the results on page 227 of analyses of representative samples of the hay won in 1911.

One difference that may be significant is shown in the composition, viz., in the relative proportions of albuminoids and "amides." The latter are much more abundant relatively to the true albuminoids in the "rich manure" hay than in the "poor manure" hay, the proportions being roughly 1:3 and 1:5 respectively. If this difference was actually due to the manure it was precisely what one would expect, in view of the more liberal supply of nitrogenous matter—especially ammonia—in the richer manure.

The above computation of the realised difference in value of the two manures is not quite complete, in that it does not take into account the greater value of the aftermath on the "rich dung" plots as contrasted with the "poor dung" plots. This was not measured in any way, but it was obvious to the eye that there was a marked difference in this respect. It does not appreciably affect the general conclusion, however, that the estimated difference in value between the two lots of manure is hardly likely to be realised in increased hay crops.

*Recovery in Crop of Estimated Difference in Manure Values
of Foods consumed.*

In the schedule on page 222 it was computed that the manure made by Group I. would contain fertilising matters, coming from the food, to the value of £10, 19s. 8d., whilst the corresponding value for Group II. was £11, 7s. 6d. Since these values were distributed throughout 43 tons and 40 tons of manure respectively, the proportions per ton would be 5s. 1d. for the "moderate feed" manure and 5s. 8d. for the "high feed" manure—a difference of 7d. per ton of manure. The return in increased hay crop for two seasons was valued on page 227 at 1s. 3d. per ton of manure, so that the difference in manure value of the two rations would appear to have been well recovered. It must be remembered, however, that it is, to say the least, doubtful whether the "increase" recorded was really due to the difference between the two lots of dung or to inevitable errors of experiment. Moreover, it is hardly possible to test such small differences with precision in experiments of this character.

Bullock-Feeding Experiment, 1909-10.

The feeding-trial of 1908-9 was repeated by Professor Seton on similar lines in the following winter, so that further material

was afforded for experiment upon the relative values of manures of different composition produced from the same foods.

In this season each group of bullocks consisted of five animals, selected from a batch of twelve Irish bullocks, of weights ranging from 9 cwt. 8 lb. to 9 cwt. 3 qrs. 4 lb., that were purchased at York on November 4, 1909. The experiment was continued from November 28, 1909 to April 8, 1910—a period of 19 weeks. The character of the feeding is indicated in the following schedule:—

DAILY RATIONS.

GROUP I. (MODERATE FEED).

	FIRST PERIOD.	SECOND PERIOD.	THIRD PERIOD.	FOURTH PERIOD.
	Nov. 28, '09– Jan. 15, '10 (7 weeks).	Jan. 16–Feb. 12 (4 weeks).	Feb. 13–Mar 5 (3 weeks).	Mar. 6–April 8 (5 weeks).
	lb.	lb.	lb.	lb.
Roots . . .	112	112	140	140
Chopped straw	7	7	7	7
Long straw .	8	8	8	8
Crushed oats .	2	2	2	2
Linseed-cake .	1	2	2	3
Decort. cotton- seed meal }	1	...	...	...
GROUP II. (HIGH FEED).				
Roots . . .	70	70	70	70
Chopped straw	7	7	7	7
Long straw .	8	8	8	8
Crushed oats .	4	6	6	6
Linseed-cake .	2	4	6	9
Decort. cotton- seed meal }	2	...	...	...

The average increases in live-weight per head for the whole period of the experiment were—

Group I.—279 lb. $\pm$ 19 lb. (=2.13 lb. per day

Group II.—295 lb. $\pm$ 17 lb. (=2.25 lb. per day

It will be seen that, as in the previous winter, the more richly-fed bullocks made practically no greater gain in live-weight than those on the moderate ration. The difference in

the estimated cost of feeding for the whole period amounted, however, to fully 38s. per head.

Manure Values of the two Rations.

The values of the manurial residues from the foods, as computed on the same lines as those followed on page 222, are given below.

	GROUP I. (Moderate Feed).		GROUP II. (High Feed).	
	Weight of Food consumed.	Value of Manurial Residues.	Weight of Food consumed.	Value of Manurial Residues.
	lb.	£ s. d.	lb.	£ s. d.
Roots . . .	79,975	4 15 2	45,815	2 14 7
Straw . . .	5,875	1 4 11	6,847	1 9 1
Oats . . .	1,310	0 8 9	3,440	1 3 0
Linseed-cake . .	1,230	1 0 6	3,165	2 12 8
Cotton-seed meal .	245	0 6 0	490	0 12 0
Total value of manurial residues		7 15 4		8 11 4
Balance in favour of Group II.				0 16 0

According to this calculation, the manure made by Group II. should have contained manurial ingredients derived from the foods valued at 16s. more than those in the manure made by Group I.

The greater amount of watery food consumed by Group I. involved a more liberal use of litter, so that a greater weight of manure was produced than was made by Group II.

Composition and Estimated Value of Manures.

The two lots of manure were sampled on April 13, 1910, as soon as possible after the animals were removed, and again on October 11, 1910. Throughout the interval between the samplings the manure lay undisturbed in the covered yard.

The sampling was carried out as in the previous year (p. 223),

two samples being taken of each lot. The results of the analyses are given below.

GROUP I. (MODERATE FEED).

	FRESH MANURE (April 18).			ROTTED MANURE as used (October 11).		
	Sample A.	Sample B.	Average.	Sample A.	Sample B.	Average.
Moisture . . .	% 78.7	% 79.2	% 78.9	% 80.9	% 80.5	% 80.7
Dry matter . . .	21.3	20.8	21.1	19.1	19.5	19.3
Organic matter . .	18.0	17.4	17.7	16.0	16.3	16.1
Ash	3.31	3.42	3.36	3.10	3.22	3.16
Nitrogen, total . .	.302	.302	.302	.315	.302	.309
Nitrogen present as ammonia	.078	{ .077 } { .070 }	.075	.044	.043	.044
Phosphoric acid (P_2O_5)	.394	.414	.404	.255	.265	.260
Potash (K_2O) . . .	.876	.836	.856	.625	.605	.615
Lime (CaO) . . .	.245	.265	.256	.209	.205	.208
Sand, &c.	1.58	1.63	1.60	1.51	1.55	1.53

GROUP II. (HIGH FEED).

Moisture . . .	70.9	71.5	71.2	74.6	75.4	75.0
Dry matter . . .	29.1	28.5	28.8	25.4	24.6	25.0
Organic matter . .	25.0	24.5	24.8	21.2	20.3	20.7
Ash	4.05	4.00	4.02	4.24	4.33	4.29
Nitrogen, total . .	.506	.484	.495	.472	.467	.470
Nitrogen present as ammonia	.113	{ .110 } { .108 }	.110	.074	.073	.074
Phosphoric acid (P_2O_5)	.432	.424	.428	.532	.522	.527
Potash (K_2O) . . .	1.003	.968	.985	.895	.912	.903
Lime (CaO) . . .	.325	.323	.324	.316	.313	.315
Sand, &c.	2.07	2.16	2.11	1.81	1.68	1.75

The greater moistness of the manure made by Group I. is again brought out by the analyses. In each case the manure was moister in the rotted state than when fresh, indicating that the loss of organic matter by fermentation during the period of storage was more rapid than loss of water by evaporation or otherwise. It is further of interest to note that whereas the proportions of phosphoric acid and potash fell considerably

during the rotting of the more watery manure (Group I.), this was not the case to any appreciable extent in the case of the drier manure. A further illustration is thus afforded of the point raised by Hendrick as to the difficulty of avoiding losses by drainage where large quantities of roots are fed.

The values per ton of the different lots of manure as calculated from their chemical composition, using the same unit prices as before (p. 224), are as follows:—

FRESH MANURE.

<i>Group I.</i>				<i>Group II.</i>			
		<i>s.</i>	<i>d.</i>			<i>s.</i>	<i>d.</i>
Nitrogen.	. '30 × 12s.	=	3 7	Nitrogen.	. '49 × 12s.	=	5 10
P ₂ O ₅	. '40 × 3s.	=	1 2	P ₂ O ₅	. '43 × 3s.	=	1 4
K ₂ O	. '86 × 4s.	=	3 5	K ₂ O	. '99 × 4s.	=	3 11
Total estimated value per ton 8 2				Total estimated value per ton 11 1			

Difference in favour of "High Feed" Manure=2s. 11d.

ROTTED MANURE.

Nitrogen.	.31 × 12s.	=	^{s.} 3	^{d.} 8	Nitrogen.	.47 × 12s.	=	^{s.} 5	^{d.} 8
P ₂ O ₅	.26 × 3s.	=	0	9	P ₂ O ₅	.53 × 3s.	=	1	7
K ₂ O	.62 × 4s.	=	2	6	K ₂ O	.90 × 4s.	=	3	7
Total estimated value per ton 6 11					Total estimated value per ton 10 10				

Difference in favour of "High Feed" Manure=3s. 11d.

Valued upon this basis, the manure from Group II. was thus worth about 3s. per ton more than that from Group I. whilst in the fresh condition, but during storage the greater losses of soluble matters suffered by the latter augmented the difference to practically 4s.

The total weights of manure at the time of the second sampling were 37 tons for Group I. and 29 tons for Group II., so that the estimated difference in value between the two lots would be:—

Group II.	.	.	.	29 tons at 10s. 10d.	=	£	s.	d.
Group I.	.	.	.	37 " " 6s. 11d.	=	15	14	2
						12	15	11

As in the previous year, the difference between the estimated values of the two lots of manure as actually obtained is far greater than the value calculated from the differences in the food consumed. This can only be interpreted again as indicating that the losses were far greater in the case of the animals receiving the more liberal supply of roots.

Field Trial with Manures.

It is, of course, only possible to give the results for one season (1911) of the comparative tests made with the two lots of manure in the field, but these may be of interest.

The manure was applied at the rate of 12 tons per acre in November 1910 to a piece of land of uniform character that had been worked, cleaned, and ridged in preparation for a swede crop. In this way an area of about 3 acres was dressed with manure from Group I., and $2\frac{1}{2}$ acres with that from Group II. Lime was applied in the following March at the rate of 3 tons per acre, and the seed (variety, Golden Melon) was drilled in May, together with a mixture of 2 cwt. superphosphate, 1 cwt. steamed bone-flour, and $\frac{3}{4}$ cwt. per acre sulphate of ammonia. A fairly uniform plant was obtained, but owing to the extraordinary character of the season the progress of the crop was only slow and the yields moderate.

The swedes were lifted on December 30, and eight portions of $\frac{1}{20}$ acre each were marked off on each of the two differently manured portions, and the produce of these weighed. The results may be summarised as follows:—

YIELD OF ROOTS PER ACRE.

	tons.	cwt.	qrs.	Probable error.
Rich manure (Group II.) . . .	15	13	2	$\pm 6\frac{1}{2}$ cwt.
Poor manure (Group I.) . . .	14	10	3	± 6 "
Difference to credit of rich manure .	1	2	3	$\pm 8\frac{1}{2}$ cwt.

There was no appreciable difference in the quality of the roots. The analysis of cores taken from 100 roots from each of the plots gave the following results:—

	Rich Manure. per cent.	Poor Manure. per cent.
Total solids	9.2	9.6
Sugar	4.77	4.47

The difference in yield is a substantial one, and being nearly three times the probable error, there is a fair degree of probability that it did arise from the difference in quality of the two lots of manure and not merely from inequalities in the soil, etc.¹

If then we credit the "high feed" manure with this increase, an extra yield of 22 or 23 cwt. of swedes, valued at, say 9s., was obtained by the use of 12 tons of the manure, or a return in the first year's crop of 9d. for each ton of manure applied. Further

¹ The difference is, however, considerably reduced if the comparison be made on the basis of dry matter, assuming that the samples used for the estimation of the latter were truly representative.

returns will doubtless be obtained in subsequent crops, but one has no hesitation in predicting that the "theoretical" difference in value of the two lots of manure, as calculated from their composition—viz., 4s. per ton—will not be realised in crop increase. In this connection, however, it must be borne in mind that the season was very unfavourable for the root crop, and it is possible that the difference in the returns might have been greater in a more favourable season, but the general conclusion could not have been vitally affected.

The results of the two experiments are thus in substantial agreement in indicating that the difference in value of the two lots of manure, as calculated from their content of nitrogen, phosphoric acid, and potash, on the lines usually followed in the chemical valuation of manures, are not likely to be realised in crop returns, either where the manures were applied to grass land or to the root crop.

*Recovery in Crop of Estimated Difference in Manure Values
of Foods consumed.*

In the schedule on p. 230 the values of the manurial ingredients derived from the foods consumed were estimated to be £7, 15s. 4d. for Group I. and £8, 11s. 4d. for Group II. These values were distributed through 37 tons and 29 tons of manure respectively, so that the proportions per ton would be 4s. 2d. for the "moderate feed" manure and 5s. 11d. for the "high feed" manure—a difference of 1s. 9d. per ton of manure. The return obtained in the crop of swedes for which the manures were applied was valued above at 9d. per ton of manure, leaving more than one-half of the estimated difference in the manure-values of the two rations to be realised in subsequent crops. Here again, however, the difference to be measured is relatively so small, and the probable errors of experiment so great, that the conclusions upon this point cannot be regarded as very trustworthy.

Conclusion.

The results summarised in the foregoing pages are put forward mainly as illustrations of the following points:—

- (a) The difference in composition between the manures produced by animals fed under the same conditions but on different rations may differ widely from that which the composition of the foods consumed would lead one to expect. This is especially the case where the amounts of "roots" included in the rations differ greatly.

- (b) The chemical composition of the manures by itself is not a reliable measure of their relative values.

In our experiments the richer manure has in each case apparently given the better crop, but the differences in value thus far realised have been well below those calculated from the chemical composition by the ordinary method of computation.

These are no new discoveries, but have indeed been matters of common knowledge for many years. They are still so frequently ignored or overlooked, however, that no apology is needed for directing attention towards them once more. Now that the practice of crediting each food with its special manure value, based mainly upon theoretical considerations, is becoming general, it is important that the farmer and valuer should realise how greatly the attainment of these values, even in the manure as used, may be affected by the *conditions* under which the foods are consumed. The most important of these conditions—viz., the volume of urine produced and the degree of completeness with which it is conserved—have been discussed in detail so recently in the 'Transactions' that it is unnecessary to enlarge further upon them here.

Further, it is important that it shall be clearly understood that the difference in chemical composition between two lots of farmyard manure is only one of many factors that determine the difference, if any, in their influence upon the growth of any particular crop. Thus there may be appreciable differences in their effects upon the texture of the soil, or upon the retentive power of the soil for moisture, or upon the numbers and activities of the micro-organisms of the soil. Recent investigations would appear to indicate that the last-named factor must indeed be credited with a most potent influence in determining the effects of the manures.

All these various factors will play their part in determining the effect of each manure upon the crop, but the predominant one will be that one in respect of which the unmanured soil is most deficient. If this "limiting factor" be the supply of moisture (as determined by the character or situation of the soil, or by the amount and distribution of the rainfall), then any differences between the effects of the two lots of manure upon the crop will be determined more by their influence upon the moisture-retaining properties of the soil than by their chemical composition. It may thus happen, and cases are by no means rare, that the manure which is esteemed of lower value when judged by its content of plant-food, may actually give quite as good results in the field as another lot of manure that has been adjudged to be of higher value.

If, however, the supply of plant-food in the soil be the "limiting factor" that determines the amount of crop obtainable on the soil to which the manures are applied, then the differences in their chemical composition should be directly evident in the returns obtained by their use.

It follows from the preceding considerations that the practice of assessing the manure-values of food, or the relative values of different lots of farmyard manure, upon the basis of their content of fertilising ingredients is defective, in that it takes into account only one of several factors that may influence these values.

A vast amount of investigation remains to be carried out, however, before we can hope to devise fully satisfactory methods of computation of manure-values, if indeed such can be devised. For the present the chemical method, based upon sound principles so far as it goes, is unquestionably the best available and must serve. If interpreted with due regard to its limitations, the conclusions to which it leads may be regarded as at least reasonable probabilities. It is very necessary, however, now that its application is embodied in the law relating to land-tenure, that it shall be openly acknowledged as a temporary expedient rather than a permanent solution of the problem.

THE UTILITY POULTRY INDUSTRY IN SCOTLAND.

BEING A STATEMENT AS TO THE PRESENT STATUS OF THE INDUSTRY; A DESCRIPTION OF THE EFFORTS NOW BEING PUT FORWARD FOR ITS ADVANCEMENT; A REVIEW OF THE RESULTS THAT HAVE BEEN SECURED, AND A SUGGESTION FOR AN ALTERATION IN METHOD.

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It is always more or less a matter of difficulty to define precisely the position of any industry, for the reason that so many indicative points have to be brought together, compared, and the whole used as a basis for a definite realisation of the facts of the case. This is the position which presents itself to any one trying to arrive at some true understanding as to the present status of the utility poultry industry in Scotland, as distinct from the breeding of poultry by amateurs and exhibitors.

The production of eggs and poultry is practically universal in the country, though still on a limited and inadequate scale; but as a considerable proportion of the produce is consumed in the neighbourhood of the area of production, it is difficult to estimate the total value as a whole. From facts and particulars submitted to the Departmental Committee appointed by the Secretary for Scotland in 1908 to inquire into and report on the poultry industry in Scotland, it may be computed that the whole poultry produce of the country cannot be valued at a sum much higher than £1,000,000 per annum. Again, without going into an exhaustive mass of figures treating with imports, the total value of poultry and poultry produce consumed may be estimated at a sum upwards of £3,000,000 a-year.

The above approximate estimates are sufficient to show that the present position as regards production is far from what is desirable, and that, in view of the huge sum of money spent by our people annually on eggs and poultry, the industry is worthy of the consideration of every one. This serious aspect of affairs is not only one of immediate interest to the producing section of the community, but is also of vital importance to those who may be regarded as the consuming section of the population.

The position is rendered still more important by the fact that there is every possibility that the supply of foreign eggs may be considerably curtailed in the near future. The consumption of eggs and poultry in Germany is advancing more rapidly than production, and since Germany lies in the midst of the producing countries of Europe, there is every probability that a larger portion of the eggs from Russia, the near East, Italy and Austria-Hungary, will be deviated towards that country. Mr Edward Brown, F.L.S., Hon. Sec. of the National Poultry Organisation Society, in his recently published 'Report of the Poultry Industry in Germany,' says: "It is evident that to a greater extent than in the past decade Germany will become an increasing factor of the inter-European trade in eggs and poultry, and, therefore, exert a vast influence upon producing and consuming countries—in the former by offering another market, in the latter by competing for supplies." There is every indication that a slightly increased price on the German market would mean a shortage of something like 934,000,000 eggs in the British market. In view of this fact, we must depend upon our own resources to a greater extent than ever before, and must therefore develop production throughout the United Kingdom.

The demand for the finer quality of table poultry is more or less limited in Scotland, and therefore we take it that the greater part of the amount spent on poultry products is for eggs. For this reason the question of increased egg-production

is of first importance. It must be admitted that very little attempt has so far been made to meet the demand for first-class table birds, and there is little doubt that in future the fattening of fowls in suitable districts, and with suitable breeds, might become a profitable branch; but for the present we should devote our attention primarily to increasing the egg-yield of the country, excepting in so far as the disposal of surplus male birds renders it necessary for us to consider their preparation for market.

In developing the poultry industry our object, in the first place, should be to assist those who are engaged in production; but in doing so the consumers will be indirectly benefited as well.

Scotland is essentially an agricultural country as well as an industrial one, and as such should endeavour to produce, as far as she possibly can, supplies of perishable food-stuffs for her needs; as it is, she only produces about one-third of the poultry produce necessary for her requirements. That this can be materially altered is undoubted, and with the dissemination of instruction, and consequent improved methods of management as regards production and marketing of produce, we should in a few years be able to greatly alter the position, and see Scotland capable of supplying to a larger extent the requirements of her own people. This, broadly speaking, is the object of all endeavours that are being put forward for the development and advancement of this important industry.

It is unnecessary to refer in detail to the advancement that Ireland has made during the past two decades, for the facts made public at the Poultry Conference, held at Dublin in May 1911, are still fresh in the minds of many, and are now available to all in the form of a published report which has been issued by the Department of Agriculture. Mention might, however, be made of one particular—namely, that the Irish are realising close on £5,000,000 per annum from their fowls. If Ireland has succeeded to this extent, surely it might be safely urged that Scotland is capable of creating an industry of equal importance. If development is to be complete and lasting, there are certain definite lines along which such advancement must be made, for poultry-keeping on the utility side cannot be profitable under all circumstances. It is, therefore, that branch known as Farm Poultry-keeping which should be developed, for only under such conditions can this industry be made a financial success.

There is one branch of the industry to which mention should be made, though it should not really be included under the heading of utility poultry-keeping—viz., that which is termed “breeding farms.” A breeding farm is one on which

pure-bred stock are kept, and from which eggs for hatching, day-old chickens, and stock birds are sold. Such farms, even though run on intensive lines, can be made profitable; but it should be pointed out that the demand in this direction is strictly limited, and that if too many are established they cannot all prove successful. The supply of market produce is only indirectly helped by this branch. This is the work of specialists, and therefore need not be further considered in this connection.

Apart from breeding farms there are two main aspects of utility poultry-keeping—namely, poultry-farming and farm poultry-keeping. A few words will be sufficient to define the difference. By poultry-farming we mean the pursuit under which a large number of birds are kept on a comparatively limited area of land, under the intensive culture system. In this case rent has to be paid, the labour entailed is considerable, and the greater part of the food-stuffs have to be purchased from an outside source. Neither in this or any other country, so far as the writer is aware, have such farms, where the only source of income is derived from the sale of eggs and flesh for eating purposes, proved financially sound after running three years, except in the case of duck-breeding. Moreover, unless new methods of production are discovered, poultry-keeping under such conditions cannot be recommended as a profitable venture.

Farm poultry-keeping is a different proposition altogether. We denote by the use of this term the keeping of poultry as an essential adjunct of the farm. The number of stock kept must depend on circumstances. In this case no rent has to be paid, no additional labour provided, and the greater part of the food is produced on the land, made up principally of the natural supplies the fowls will gather for themselves when given their liberty, together with any waste feeding-stuff, such as weathered corn or small potatoes and the like, that may be available. Only a small quantity of artificial food has to be bought to make the whole into a proper ration for the birds.

To attain the result aimed at, it is not necessary to advocate an increase in the number of fowls kept. Given good birds, suitable to climate and soil, correct mating and breeding, hygienic housing and proper feeding, the increased results should go far in making up the present difference between supply and demand, without any great addition to the number of birds kept. It is not suggested that large profits are to be made by this branch of farming, but it can be made a lucrative industry. If the poultry are given the same attention, the same care, and the same thought that we find bestowed on larger stock, then they will make a greater return for the capital out-

lay than any other class of stock we can keep. It should be pointed out, however, that the conditions essential to farm poultry-keeping being conducted profitably must be carried out in their entirety, especially with regard to the number of stock maintained. This applies to large and small holdings alike.

It is frequently argued that the addition of perhaps an annual sum of £20 to £50 to a farmer, or £5 to £8 in the case of a crofter, is hardly worthy of consideration. Those who know the conditions under which crofting communities live, are able to realise that such a sum, small though it may appear, is one that is of material importance to the recipients. Even in the case of a larger holder of land such an additional yearly sum of money, procured from an added product, will prove of distinct benefit. The prosperity of a country is known by the prosperity of each unit that goes to make up the whole, and therefore who can say that the future development of this industry may not mean a national asset of great value?

It is also true that it is the accumulated produce from an infinite number of small producers that together forms the backbone of this industry, and therefore it is to the small holders we must look, rather than to the individuals who farm on a much larger scale. In America, the land of big ranches, it is estimated that 95 per cent of the eggs and poultry consumed come from the ordinary farms. The same thing is true of Denmark, for there farm produce accounts for about 99 per cent of the total egg production.

Enough has been said to demonstrate that there is strong justification for an earnest endeavour being made to develop this industry and to put it on a firm commercial basis. Attention may now be directed to the arrangements that have been made, and are being carried out to this end.

Public Bodies and their Work.

For many years past endeavours have been put forward, though somewhat of a spasmodic nature, to develop this industry mainly by the giving of public lectures. Some credit for the present organised action, on the part of public authorities, is due to Lord Pentland, who in 1908, as Secretary for Scotland, appointed the Departmental Committee already referred to, to inquire into the industry of poultry-keeping in Scotland. Although the reference in the first place was to conduct inquiries in the Highlands and Islands, the remit was extended at a later date to include the whole country. The findings of that Committee, as embodied in their Report and Recommendations, were calculated to stimulate and encourage increased efforts being made by public bodies to assist and

promote the successful working of this branch of agriculture. It may, however, be many years before all the suggestions made in that Report can be put into practice.

There are three ways in which advancement can be brought about—namely, by education, by the introduction of new stock of a better quality with a higher productive value, and by organisation in marketing. To-day encouragement is given to the producer along these lines, and the five public bodies that are engaged in the work each help in one or more directions. The authorities concerned are the Congested Districts Board, the West of Scotland Agricultural College, the Aberdeen College, the Edinburgh College, and the Scottish Agricultural Organisation Society. The means employed by the Agricultural Colleges and the Organisation Society have frequently been explained in the public press, but as regards the work of the Congested Districts Board, which has only recently been organised, it is necessary to deal more fully.

The Congested Districts Board.

One of the recommendations of the Poultry Committee, referred to above, and which was urged by practical experienced witnesses who gave evidence before the Committee, was as follows: "That the system hitherto adopted by the Congested Districts Board of buying settings of eggs at a considerable distance from the districts where they are to be distributed should not be continued, but that instead breeding centres should be established from which eggs and birds could be distributed to crofters and others without the risks of long transit by rail and other means of conveyance." The report of the Committee was published in the spring of 1909, and the same year the Congested Districts Board resolved to establish a limited number of egg-distributing stations in the congested districts.

After careful consideration, 18 centres were established in the spring of 1910 in Orkney, Caithness, Sutherland, Wester Ross, Lewis, North and South Uist, and Skye. Comprehensive rules were laid down dealing with the management of these stations. Briefly stated, the managers of these egg-distributing stations were supplied with a movable poultry-house and pen of fowls, the same remaining the property of the Board. The managers were bound to supply eggs for sitting, during the months of January to May inclusive, to crofters and cottars at a nominal price, but received from the Board an additional sum to bring the total price to 2s. 6d. per dozen. In some instances the managers already possessed suitable appliances and birds, in which case the Board contributed an extra shilling, so that the sale price was 3s. 6d. per dozen.

In the spring of 1911, these 18 centres were increased to 24 by the formation of 6 new stations in Caithness, Lewis, and South Uist. At the same time the head of stock was increased to a full pen of 22 to 26 birds.

The stations established at this time, although doing away to a certain extent with the necessity for supplying travelled eggs, did not by any means prove sufficient, as the following figures will show.

Eggs distributed before the formation of the egg stations—

1904	555 sittings.
1905	697 "
1906	886 "
1907	1440 "
1908	1470 "
1909	1002 "

Eggs distributed after the formation of the egg stations—

	From the egg stations.	From other sources.	Total.
1910	950 sittings.	1154 sittings.	2104 sittings.
1911	1904 "	997 "	2901 "

The demand for these eggs from pure-bred birds and the success of the work during the past two years certainly warrants a still further increase in the number of egg stations, and therefore the Board is now establishing an additional 13 stations in Shetland, especially necessary owing to the distance from the mainland and the consequent risk in transit, 8 in North and South Uist, and 6 in Argyllshire. This will bring the total number of centres to over 50.

Although fully recognising the superiority of the winter-laying breeds, such as the Wyandottes, Orpingtons, Rocks, and Rhode Island Reds, the Board realises that the prejudices of the crofters and cottars must be taken into account. As far as possible these breeds are introduced, but it is found necessary in some instances, particularly in the more distant parts, to distribute some of the lighter breeds, such as the different varieties of Leghorn. As poultry-keepers begin to understand more fully the advantages of the heavier winter-laying breeds, and when they begin to appreciate the fact that the small extra cost of feeding is more than made up by the increase in production at the dearer season of the year, the number of summer-laying birds will be decreased.

In the autumn of 1910 arrangements were entered into between the Board and the Aberdeen College for co-operation in the promotion of the industry in the northern counties, and this past autumn similar arrangements have been made with the West of Scotland Agricultural College. The basis of the

agreement in both instances is that the Board will be responsible for the formation of the egg stations and the necessary subsidiary cost entailed, and the colleges will be responsible for all education in their respective counties. A very important clause is to the effect that, in the event of cases of disease occurring amongst poultry in the congested districts, the colleges will investigate the same and furnish reports thereon for the information of the Board.

This form of co-operation should be productive of good results in the future, for it is certainly true that the industry has suffered in the past to a considerable extent by the playing of the "lone hand" on the part of public authorities. This point will be referred to more fully under Agricultural Colleges.

The Agricultural Colleges.

The work conducted by the agricultural colleges is entirely educational, and there is no doubt that this is of the utmost importance to producers. The methods that have been employed in the past by poultry-keepers generally have not proved satisfactory, hence newer and better systems of general management must be introduced. Knowledge is disseminated by means of public lectures, varying from a single meeting to a course of six or seven; by meetings at Agricultural shows; by visits to farms and crofts; and by the publication of bulletins. The lectures are well attended as a general rule, and a considerable amount of interest is stimulated thereby. During 1910-11, 84 public lectures and 20 lectures at shows were given under the auspices of the West of Scotland Agricultural College; 276 meetings were held under the North and 157 under the East of Scotland Colleges. In addition to this, a number of students were trained in more advanced poultry-keeping at the School of Poultry Husbandry at Holmes Farm, and at Whitsunday 1910 a Poultry Station and Demonstration Croft was started by the Aberdeen College, at which centre valuable work has been done during the past year.

The Scottish Agricultural Organisation Society.

This Society was brought into being a little over five years ago, and even in this short period has been the means of advancing the industry to a considerable extent. Egg-collecting depôts are established wherever the amount of production warrants it, and to-day there are 42 such centres. These are all established on a co-operative basis, and registered under the Industrial and Provident Societies Acts, and each one is affiliated to the Central Organisation Society. In the past the

parent society has helped in securing an outlet for the produce in the best markets, but it is found that the older societies are frequently able to establish a good connection for themselves, and only the more recently formed require assistance in this direction. It is, however, now considered necessary to form a special Marketing Federation, so as to take this part of the work out of the hands of the Central Organisation, thus giving it a greater opportunity to concentrate its labours in an educational direction. The very fact that this step has now become a necessity indicates the good results that have accrued from the endeavours of the Society.

In addition to the work of organising the marketing of produce, the S.A.O.S. is an important educational factor. During the past year 112 lectures have been given at meetings of affiliated societies, and large numbers of leaflets have been published and distributed.

The grant of £50 given by the Highland and Agricultural Society for the improvement of the poultry kept by small holders in the Highlands and Islands, has been expended on the distribution of eggs from pure-bred fowls of approved breeds for hatching and in the purchase and distribution of pure-bred cockerels. From this source 506 settings of eggs and 287 cockerels have been given to small holders in a number of counties, under conditions of distribution similar to those of the Congested Districts Board.

*The Real Value of Present Organisation.
The Congested Districts Board.*

Bearing in mind that a beginning was only made in 1909 in the formation of egg-distributing centres, it is as yet too early to say very much with reference to results. There can be no doubt that the Board is working along right lines, and that, acting in co-operation with the other bodies referred to, each working in its own particular sphere, an immense improvement must inevitably in a few years result. It is unfortunate that it is found necessary to distribute the lighter breeds in some districts, for they are not likely to do much to increase winter egg-production. However, this will undoubtedly be changed as opportunity permits. It is worthy of consideration whether the egg-distributing centres should not be converted into hatching stations, from which day-old chickens could be procured by the crofters and cottars instead of eggs. It has been found in the past that hatching operations are not always carefully carried out, and the plan indicated would tend to decrease loss, as disease is often conveyed to the young stock by means of the diseased broody hen. The introduction of trap-nests at

these centres would also tend to improve the quality of the stock. Help in one form or another is also urgently needed by the small holder in the congested districts towards the construction of suitable houses and appliances.

The Agricultural Colleges.

The expense incurred in educational work is justified by the fact that it is infinitely cheaper and easier for the people to delegate to public bodies the work of experiment and teaching. The mistakes incidental to investigation are sometimes costly, if borne by individuals, who try experiments for themselves without guidance and system, but if assessed upon the entire population the cost is infinitesimal.

The colleges are concerned with educational matters only, and upon this subject much can be said. The mass of the people will never be able to visit a college for the purpose of receiving instruction, but education can and must be taken into the rural districts.

As will have been seen by the foregoing, the principal effort on the part of the colleges is in disseminating information at public meetings. These public lectures do undoubtedly serve one good purpose—namely, they awaken interest in the subject; but the value of such meetings, whilst necessary at the outset, has its limitations. In a case of this kind it is quite impossible to judge by published reports. On some occasions a lecturer may have an audience of upwards of 200, whilst on others perhaps half a dozen or eight persons. Judging by reports alone, one would come to the conclusion that the more successful meeting, estimated by attendance, would be more productive of results, but such is not necessarily the case. In some instances, where the attendance has only been a score, the influence has been greater and more lasting than at other places where five times the number turned up to hear the lecture. Reports giving statistics, whilst no doubt necessary, do not in any way convey an adequate idea of whether lasting effect and benefit has resulted.

In reading over particulars as to the total number of meetings, and the total attendances held under the auspices of the colleges, one can glean nothing to indicate the extent by which the industry has been advanced. The utility value of lectures may be regarded mainly as a stepping-stone to something better. That they have a value is no doubt true, but only inasmuch as they are used to illustrate practical teaching and to tabulate certain facts and figures in the minds of the hearers.

There is a need in Scotland at present for practical instructors in addition to lecturers. This does not call for less expert

knowledge; in fact, one of the essentials is that teachers must be experts in their subject in both theory and practice, so that they will be able to give added weight to their practical advice by means of scientific proof. The reason why, should follow action, and be explanatory of that action. There is a widespread distrust on the part of the farming community of those college teachers who are merely theorists; therefore, unless the teacher can demonstrate that he is practical as well as theoretical, the influence on the hearers will be but slight.

Reference has already been made to the working agreement that has been entered into by the Congested Districts Board and the Glasgow and Aberdeen Agricultural Colleges, and herein lies the solution of the question. The Board has established over fifty egg-distributing centres in the congested areas. The practical instructor should teach the people by visits to their own crofts, and conduct short courses of training on the egg stations. Practical work could be taught, comprising mating, hatching, feeding, and preparation of produce for market, and there is no reason why lessons in carpentry should not be included, so that the poultry-keepers would be able to construct their own appliances.

In other districts the instructor should spend the greater part of his time in visiting and advising farmers and others on their own places. After a while he could get the people together occasionally, and talk to them along more technical lines.

The work of a college is to attempt to eliminate false teaching, to weed out unprofitable practices, and to make experiments as to practical methods for application to farm conditions. Our colleges have so far failed in their duty to the public in this direction, in that so little experimental work has been attempted. That side of the work offers practically a virgin field in this country, since very little has been accomplished in the past. Unless this branch is taken up at once the industry of utility poultry-keeping will be hampered at the very outset.

The Scottish Agricultural Organisation Society.

It has already been pointed out that results cannot be judged by reports, but that the real substantial results are those that are never stated in black and white. This statement may be more firmly expressed and strengthened by reference to the marketing section of the S.A.O.S. The total value of the produce handled by the affiliated societies amounted to upwards of £22,000 in the past year. When this is compared with the value of the whole poultry produce of the coun-

try—namely, over £1,000,000—the sum appears insignificant. The results, however, have been greater and more lasting than are indicated by these figures. It is freely acknowledged by retailers of eggs that the standard of quality of home produce has been raised considerably since the co-operative movement began, and that, although much still remains to be done, traders now regard the home-produced article with greater favour. Even if all the societies were to close up to-day, the benefits of the work of the past would remain and yield a thousand times more than it has cost in time, labour, and money. Although the report of the S.A.O.S. proves interesting reading, it does not tell a hundredth part of the great work that it is performing on behalf of producer, retailer, and consumer alike. Advancement has been rapid in the past, but with the formation of the Marketing Federation of Egg-collecting Societies, and the then greater opportunities that will present themselves to the parent society, we anticipate even more rapid development in the future. All those who are concerned in the promotion of the industry realise that organisation and increased production must go hand in hand. Educational work will be largely in vain unless an adequate outlet is provided for the produce. Lecturers and practical instructors will do well to keep this fact always before them. In the past the marketing and educational organisations have failed to work together, but there is every indication that a combination of effort will be a great feature in the future development of the industry. To demonstrate the value of improved marketing, it may safely be stated that were the total produce of the country marketed under better conditions, the returns to the producer would be increased by at least 25 per cent without the addition of a single egg to the number already being produced.

Farm Poultry-Keeping.

There are two systems of poultry-keeping that can be followed successfully on farms and crofts—namely, the use of portable houses and the colony method. They are both suitable, but under certain conditions the latter is to be preferred. The method of keeping fowls in movable houses, giving the birds their entire liberty, is so well understood that little need be said on the subject; but in this country, at any rate, the colony system has but seldom been tried, and therefore a description of it may prove useful.

Housing the fowls in some shed which is part of the steading, under such conditions that the only run-out the birds have is in the rickyard and the farmyard itself, is not satisfactory.

In this instance the supplies of natural food in the soil are untouched, the manure is for the most part wasted, and the health of the birds is impaired. To house them out on the land means increased profits, for sufficient natural food will be gathered to take the place of about one-half of the amount required for profitable feeding; the manure, the value of which is about 1s. 1d. per bird per annum, is deposited on the land just where most needed, and the high vitality of the stock is maintained and the vigour increased. When the size of the holding allows for the adoption of this system, and especially where grass is the principal crop, it can be confidently recommended.

The colony system, perhaps, is more suited to smaller crofts and arable farms, though the initial outlay for appliances is greater. Under this method an area of arable land is partitioned off, and birds are kept therein at the rate of one hundred to the acre. It is advisable to have this allotted space sufficient to allow for ploughing, therefore not less than an acre in extent. The fowls are housed in portable sheds, and remain on the same land for twelve months, when the whole run is moved to fresh ground. This land is then cultivated according to the usual rotation of crops for three or four years. Apart from the question of housing, which is the same in both cases, the cost for netting and posts amounts to about £5, 10s. for one acre, £8 for two acres, £9, 10s. for three acres, and £11 for four acres. In this case rent must be paid for the area of ground utilised, but this is more than made up by the manure, which under present conditions is practically all lost, for the value of this is over £5, 5s. per acre.

This system is largely in vogue in America, and has proved eminently satisfactory; and there is little doubt, were it given a prolonged trial in this country, it would prove equally as successful. Although, as has already been stated, it may not be advisable to increase the head of stock kept on the land in some districts, there are at the same time many districts in which a greatly increased stock of poultry might be kept. On some of the larger farms in the south there is no reason why five or six hundred birds should not be kept, and in such cases the introduction of this colony system would decrease the labour and render poultry-keeping on such a scale a profitable branch of the farming operations.

Conclusion.

Attention has been directed to the present organisations that are working for the promotion of the utility of the poultry industry, and to the results that are likely to accrue in the future.

One further fact might be emphasised—namely, that those who are working in this direction have many prejudices to break down and many difficulties to overcome, and though the results on the whole are encouraging and gratifying, there are occasional disappointments. The workers in this cause have the consolation of realising that they are labouring for the welfare of those who are making their livelihood from off the soil, and in doing so are contributing to the prosperity of the whole country. In our work we ask all those who have the wellbeing of our rural population at heart to give us their sympathy and encouragement, so that we may bring to an ultimate successful issue the object we have in view.

FIFE AND ITS FARMING.

By ANDREW S. GRANT, 'North British Agriculturist,' Edinburgh.

THE visit this year of the Highland and Agricultural Society to Fife with its annual Show is sure to invest the famous peninsula county with special interest in the eyes of agriculturists. This will be the first occasion in its long history on which the national Show has been held in "The Kingdom." Yet Fifeshire is one of the most varied and interesting agricultural counties in the whole of Scotland. From a wheat-growing point of view it actually stands first in the matter of area, having in 1911 had no fewer than 12,992 acres devoted to this crop. Forfarshire came next with 10,670 acres, while East Lothian was third with 7658 acres.

The county does not show up quite so well in the matter of yield, the number of bushels credited to it, also in 1911, being 41·51 per acre. This is considerably short of the 46·83 and 46·29 bushel yields returned respectively in the case of the neighbouring counties of Clackmannan and Kinross, but in these counties the areas of wheat grown were very much smaller than was the case in Fifeshire, Kinross-shire especially having only some 90 acres in all in 1911, while the acreage of Clackmannanshire was just 375 acres. But although the Fife yield of 41·51 bushels in 1911 was not actually the best in Scotland, it stands comparatively high amongst the larger Scottish wheat-growing counties, only Mid-Lothian with 48·19 bushels being substantially ahead of it last year. The average

of the county for the ten years 1901-10 was 37·52 bushels, a very good average considering the large area grown. Those in the trade know that some of the best wheat raised in the country is grown on the deep lands of the shore districts of Fife, particularly towards the western limits of the county. In barley-growing Fife stood third in order amongst the Scottish counties in 1911, with an area of 16,898 acres, Forfarshire this time being first with the large total of 24,300 acres (a drop, however, of nearly 3000 acres from 1910), while Berwick was second with 18,693 acres. This latter county also showed a drop from 1910, but not to the same extent as Forfarshire. Oats in the county in 1911 worked out at 39,888 acres—this was its largest crop—and hay (all kinds) at 35,068 acres, the latter showing an increase of nearly 2000 acres from 1910. Each of these figures compare very favourably with similarly sized and situated counties in Scotland.

Fifeshire also grows a big quantity of potatoes every year, the area in the county credited to this crop in 1911 being 16,342 acres, a gain of about 1000 acres from the previous year, while it had 22,569 acres of turnips. As a cropping county, therefore, it is one of the most important in Scotland.

Historical.

Although it does not greatly concern us at present, it is interesting to note as a historical fact, that Fife, or Fyfe as it was then rendered, occupied at one time a much larger constituent part of Scotland than does the county to-day. In these days Fyfe included not only what is now known as the counties of Clackmannan and Kinross, but also parts of Perthshire and Stirlingshire as well. This large area was known as Ross, a term signifying a peninsula. The dismembering process seems to have begun early in the fourteenth century, when first Clackmannan and then Kinross were lopped off and erected into independent shires. Even as late as 1891 the county suffered some further modifications in its configuration. In that year, at the instance of the Boundary Commissioners, a part of the north of the parish of Dunfermline was transferred to Kinross-shire, while Fife acquired a detached portion of the parish of Portmoak. More important still was the transference to the county of the parishes of Culross and Tulliallan, which had previously formed part of Perthshire, but were separated from it by Clackmannanshire.

The original possessors of Fife seem to have been the Celts, who were invaded by the Romans. Towards the end of the ninth century the kings of the Scots obtained a paramount sway over the district. Between this period and the eleventh

century the county was in great measure either the property or under the jurisdiction of a succession of "Thanes" of the name of Macduff. One of these, Duncan Macduff, was created Earl of Fife by Malcolm III. about 1057. From this time until the family honours were merged by the marriage of female heirs or became extinct in other families and finally lost by forfeiture in 1424, the Earls of Fife were amongst the most influential of the Scottish peerage. After the lapse of more than three centuries the ancient title of Earl of Fife was revived as an Irish peerage in 1759 in the person of William Duff, Lord Braco of Kilbride, who, according to his genealogists, derived his descent from the original earls. The Duke of Fife, whose death occurred so tragically in Upper Egypt in the early part of this year, was the lineal descendant of the William Duff referred to. Although the modern Earls of Fife took their title from the district, it is not known that they ever owned any land in the shire, their estates being for the most part in the counties of Banff and Aberdeen. Etymologists are not agreed as to the origin of the name of the county. The monkish chroniclers assumed its derivation to be from Fyfus Duffus, a hero who is believed to have rendered the district great service in war. On the other hand, it has been held that the name came from "Fibh," one of the seven sons of Cruithie, a Pictish chief or king, and that in the course of time it simply came to be written Fife or Fyfe. It goes without saying that Fife is rich in historical incident and romance. It is said to have more Royal burghs than any other county in Scotland, while it enjoyed great *éclat* in the old days of the Scottish Kings.

Present Area and Population.

As it exists to-day the county of Fife covers an area of 513 square miles, or about 328,400 acres. In point of size it is the sixteenth largest county in Scotland. As regards population, however, it occupies a much higher relative position, standing in this respect seventh in order amongst the Scottish counties. Only Aberdeen, Ayr, Mid-Lothian, Forfar, Lanark, and Renfrew beat it in population, and Ayr only to a very limited extent. At the last census there were in Fifeshire 267,784 inhabitants, this total showing an improvement of 48,894 upon the previous census in 1901, when the numbers were 218,840. The county, indeed, was one of the few Scottish counties which showed an increase in population at last census as compared with the immediately preceding one. The increase in the case of Fife is very generally attributed, not so much to any special change or improvement in the agricultural conditions, as to the enormous development which has taken place in

the county of late years in coal-mining. Fife, as is well known, was one of the first districts in Scotland to be worked for coal, and it still retains a very pre-eminent position in that respect, its output in 1909 being no less than 8,425,785 tons, an increase from as recently as 1905 of 1,184,346 tons. Those who have given attention to this matter are of opinion that the county is destined in the future to take an even higher position as a coal-mining centre than it has done in the past. In this connection the following extract from the Report of the Royal Commission on coal supplies, dated 1905, may be interesting:—

“The county of Fife, with the smaller quantities in Kinross, takes the leading place in Scotland in the matter of its coal resources. Besides the coal in these counties, probably two-thirds of that under the Firth of Forth will be worked by collieries in Fifeshire, so that the available resources at less than 4000 feet deep will amount to something like 5,700,000,000 tons, or sufficient to maintain the present output for 930 years. While the output from the Firth of Forth will not rapidly increase for a great many years, when so much coal is available under the land, the output from Fifeshire is certain to advance till it occupies a leading position in the Scottish coal trade.”

This is a matter that is bound to be of great importance from the point of view of agriculture in the county. Already the great advance that there has been in coal-mining in the district has changed the character of the farming methods pursued in more than one district of Fife. Many farms which twenty to twenty-five years ago or less were devoted to ordinary cropping, are now turned over almost wholly to dairying. The great increase that has taken place of late years in the county coastal summer traffic has also had a marked effect in the same direction. Fife, as is well known, has an unrivalled coast-line, stretching as it does practically from Newburgh on the Tay to Torry on the Forth, a distance roughly of eighty miles. Much of this coast-line is indented with bays which have fine sands, thus rendering them particularly well adapted for forming the popular health resorts which they have become. The links of the county are also amongst the finest in the United Kingdom, and are largely taken advantage of, particularly towards the eastern point, for golfing purposes; St Andrews, of course, being the headquarters of this now world-famous game. The coastal traffic is no doubt to a large extent a seasonal one. All the same, it brings a big extra population to Fife while it lasts, and between the two of them—coal-mining and health and pleasure seeking—they have given a distinct turn to county farming in more than one district, and have provided the generality of farmers with a valuable extra outlet for produce of various kinds.

Physical Features.

Although Fife has been considerably altered in size and shape from early times, it is, as can be seen from a glance at the map, still to a very large extent a peninsula county, being washed by water on three sides. On the south there is the Firth of Forth, on the north the Firth of Tay, and on the east the German Ocean. Its land contact with the mainland is on the north side, where it marches with the counties of Kinross, Clackmannan, and Perth. In the old days, before railways were invented, or even stage-coaches came to be used as methods of locomotion, the county must have been very inaccessible from other parts of Scotland. Even on the land side it was largely cut off from the rest of the country by ranges of hills. No doubt to its comparative isolation and its early association with the Scottish Kings would be due in some measure at least the title of "Kingdom," which is still very generally applied to the shire.

But whatever it may have been in the old days, Fife is anything but isolated now. Thanks in large measure to railway enterprise and development, the county is in these times one of the most accessible in Scotland from a travelling point of view. It has two main railway lines running through it—one by Dunfermline and Glenfarg to Perth and Inverness, and the other by Kirkcaldy and Cupar to Dundee and Aberdeen. The latter line forms an integral part of the East Coast route, from the northern centre to London. In addition to the two main lines, there are several branch lines in the county serving important districts and providing convenient facilities for travelling. This railway equipment of Fife is a feature that will be of great importance in connection with this year's Show, and in the end will no doubt be the determining factor in realising the great success which county residents are enthusiastically looking forward to.

To the stranger visiting Fife for the first time the striking feature of its surface area is the rolling undulating nature of the land. Everywhere in the county, except in the purely coastal district, one comes across "howes" and "knowes," the result no doubt of volcanic and other land movements centuries ago. Although strictly the county has no very high hills, and is usually classed as part of the low-ground of Scotland, it has quite a number of eminences more or less imposing and distinct. Thus on the north side of the county, bordering on the Tay valley, there is an extension of the Ochil range of hills which here runs in from Perthshire on the north. This extension runs south-east to Tayport, and forms what is known as the Highlands of Fife. The chief summits of this line of hills are

Lumbenny (889 feet), close to Newburgh, and Norman's Law (850 feet) farther to the east. The latter is a very striking hill, which commands a magnificent view of the valley of the Tay and the mountains beyond. Lucklaw Hill (626 feet), near Leuchars, is part of the same range. Many of the heights of this Ochil extension are wooded; others are grassy and well adapted for sheep.

A second line of hills (not, however, in this case continuous) runs through the middle of the county, forming what is known as the backbone, or riggin', of Fife. This line begins in the south-west, where the Saline Hill goes up to a height of 1178 feet, and Knock Hill to 1189 feet. To the north of these is the Cleish Hills (1241 feet) and Benarty (1131 feet). This latter hill lies directly south of Loch Leven, and separates Fife from Kinross. This line of hills has its highest point to the east of Loch Leven, where the West Lomond point is a prominent feature in the landscape. It rises to a height of 1731 feet, and is the highest eminence in the county. From the West Lomond Hill a magnificent view is got of the surrounding country, as well as of the Pentlands and the Lammermoors on the opposite side of the Forth. The West Lomond Hill is connected by a lofty ridge with the East Lomond Hill, which goes up to 1471 feet, and from which an almost equally good view can be obtained. This latter is the hill which overlooks the top of the Eden valley at Falkland, and which is such a prominent object in the landscape to the right of the main Aberdeen and Edinburgh line shortly after passing Ladybank. There are numerous other detached eminences or hills in the county, but those mentioned are the most important.

Practically the Lomond Hills divide Fifeshire into two parts. Between them and the eastern continuation of the Ochil range, which flanks the estuary of the Tay, lies the Howe of Fife, or valley of the Eden river. This valley is nearly thirty miles long, and stretches out at points to several miles broad. The town of Cupar lies in this valley. To the south of the Lomonds and the west of the hills that line the Tay, lies the other great plain of Fife, with its lower points lipping the shore. This plain includes both the valley of the Leven and its main affluent the Ore. Beyond Dunfermline the expanse is continued, though here it is more hilly, in the district that slopes down to the Forth from the Saline and Cleish Hills.

Geology and Soils.

The soils of a country or district are naturally much dependent upon the nature and character of the underlying rocks,

and Fifeshire is no exception to the rule. Stretching approximately from east to west across the north side of the county the rocks of the Upper Old Red Sandstone formation are well exposed, particularly along the Howe of Fife. These have long been celebrated on account of the great number of fossil fishes which have been found at Dura Den. Succeeding these to the south, in an upward geological succession comes the Lower Carboniferous formation, with its massive limestones. In this Limestone series occurs the "Edge" coals, which in Fife yield some of the best seams in the county, among them the Dunfermline Splint. The upper or "Index" limestones overlie the "Edge" coals. These, in turn, are succeeded by the Millstone Grit, and then the Coal Measures proper of Wemyss, Leven, and Alloa. The Carboniferous rocks of Fife, like those of this formation throughout the whole of the Midland valley of Scotland, have been much invaded by intrusive masses of Whinstone (Dolerite). In addition to these are lavas, tuffs, and volcanic necks. In virtue of their greater hardness, as a rule, the igneous rocks, particularly the whinstone sills or sheets, form the prominent features of the county. Fine examples of these sills can be studied on Benarty, the East and West Lomonds, and also at North Queensferry and Rosyth. Of the volcanic type of rocks the Binn of Burntisland and Largo Law stand out as the finest examples of old Carboniferous vents, perhaps, in Scotland. These igneous rocks decompose into a nice light brown soil, which is proverbial for amenity and fertility. Dolerite in all stages of decomposition can be admirably studied around North Queensferry.

As the igneous rocks stood out as prominences during the ice period, they are usually fairly free of till or boulder clay. The lower ground with its softer Carboniferous sediments is, as elsewhere throughout the length and breadth of the land, usually buried beneath a more or less thick coating of the farmer's terror—the stiff, cold, retentive till—which, for example, in some parts of Lanarkshire and Linlithgowshire exceeds a hundred feet in thickness. The improvement of this subsoil is one of the problems which the practical agriculturist has to face. On the east side of the county the Calciferous Sandstone series are the county rock. These occupy the same geological horizon as the oil-shale series of West Lothian, but unfortunately lack the oil shales. These rocks continue to the north of St Andrews, where the Upper Old Red Sandstones crop out from beneath them. The oil-shale series are made up of alternations of thin cement, limestones, sandstones, fakes, and shales, which, if not masked by overlying, drift, almost invariably yield

a very good soil. Later even than the time of the ice is the story of the raised beaches, which are due to successive small uplifts of the land. At Elie five of these raised beaches can still be recognised even by the ordinary observer. Along the lower parts of the coast it is these very recent deposits which form the subsoil. Many of the coast towns, such as Elie, are built upon these raised beaches.

In accordance with the variations in the formations the soil of the county varies considerably in different parts. In the section to the north of the Eden it is quick and fertile, nowhere of great depth, but well suited to the cultivation of grass. That which overlies the Carboniferous rocks consists for the most part of cold retentive clays, seldom fertile or easily wrought, but amenable under modern methods of draining and manuring to such improvement as to secure good crops. The Howe of Fife, or Stratheden, as far inland as Cupar, is very fertile, and in parts very productive. In the parish of Cameron, where the land reaches an elevation of 600 feet, the soil is stiff and cold, clayey, and mixed with lime. Around Ladybank it is shingly, and has the appearance of having had its richest earthy coating swept off by a current of water. Farther south and west it becomes heavier and more valuable; while in the high parts adjoining the Lomonds it is sharp and very suitable for grass. The same remarks hold good in the case of the highlands of Auchtermuchty, Leslie, and Kinglassie. In the parishes of Beith, Auchterderran, and Ballingry the land is cold and stiff. A good deal of the land on the north side of Dunfermline is composed of clay of a strong retentive nature, while on the south it is chiefly thin loam with a strong clayey subsoil. In the parishes of Saline, Torryburn, and Carnock, to the west, the soil is mainly a mixture of clay and loam, and is generally very fertile.

The "Laich of Dunfermline" has a strong clayey soil, somewhat stiff to cultivate, but on the whole very productive. The soil on the coast from Inverkeithing to Leven varies from light dry to strong clayey loam, but is rendered extremely fertile by superior cultivation. Largo and its environs have a deep rich loam, which produces highly satisfactory crops. In the neighbourhood of Elie it is light, but very fertile. All along the east coast there is clay and rich loam; the numerous red patches which occur so frequently on the geological map in this part of the county are for most part Dolerite sills. While rolling stones and outcrops of rocks present in this part of the county little hindrances to ploughing, here and there boulders are met with which must have been carried down during the ice period and deposited on the melting of the ice. Near St

Andrews the soil is light, and at Leuchars it tends to become sandy, a characteristic that so prevails at Tentsmuir as to render that tract of land almost useless for agriculture. The whole district of Fife was at one time very wet and swampy, but drainage and modern methods of cultivation and treatment have within the last three-quarters of a century or more combined to make the county one of the most productive and fertile to be found anywhere, as the crop-yields already quoted abundantly prove.

Rotation Cropping.

When Mr James Macdonald, the esteemed retiring Secretary of the Highland and Agricultural Society, wrote in the 'Transactions' in 1876—thirty-six years ago—on "The Agriculture of the County of Fife," he had a theme which lent itself to elaborate detailed descriptions of farming systems as they were then pursued in the county. Fifeshire, like other counties of Scotland, was at that time in what might be called the heyday of agricultural prosperity. Some years before there had been a great spurt in agricultural improvement. Marshy swamps had been reclaimed, much hill-set land had been squared off in fields and brought under the influence of the plough, while prices still remained comparatively good. Wheat at that time was still fetching well over 60s. per quarter, barley about 40s. per quarter, oats close upon 26s. on the average, while potatoes were selling at about £5 per ton. These prices naturally kept farmers in good heart, and rents in the county were well maintained, increases of as much as 12s. per acre being quoted in the cases of several farms which had recently been re-let. To-day a somewhat different tale has to be told. Although quite lately there has been some improvement, the long spell of low prices which prevailed for so many years from about the mid-eighties had a depressing effect on the industry generally, and rents all over are believed to have fallen by something like 25 per cent, if not more, from the times under notice. There have also been a good many changes in the style of farming followed. Dairying, as already indicated, now occupies a much more important position than it did then; while general stock-breeding has certainly not increased, many more farmers than formerly now depending on bought-in stock—both cattle and sheep. This system, it is held, gives a quicker return than breeding formerly did, and enables farmers to take fuller advantage of favourable markets. The scarcity of labour has also had some influence in the same direction.

In glancing briefly at systems of general farming as now pursued in the county, it may be convenient to begin in the

eastern division—in the St Andrews and Leuchars district. The land in this particular district is generally sharp and easily worked, although there are also considerable patches of clay and sand here and there. On some farms the clay is found within 500 yards of the sea, and a peculiarity is that it may occupy one field and part of the next and not be seen again for a considerable distance. This mixed sharp land and clay has its advantages, however, for in wet weather the farmer can turn off the clay and concentrate his attention on the other class of land, and *vice versa*. Potatoes are largely grown in this district, the light rainfall and the comparatively dry soil being particularly well adapted for this crop. Of late years, however, with potatoes not often above 40s. and 42s. per ton, farmers have not done so well as they formerly did with potatoes, and in many cases there has been a certain curtailment of the area devoted to this crop.

A very general rotation in this district is a six-course one, as follows: hay, oats, potatoes, wheat, turnips, and barley sown out. In cases there are variations of this rotation, particularly in the way of having one or two years of grass, but as a rule most farmers in the locality stick to the simple six-course method of farming. There are practically no fences in the district, and grass, therefore, except for cutting, is little thought of. The quick continuous succession of grain crops involved in the rotation is necessarily very trying to the land, and also very heavy on the labour and manure bills. On this account Mr Macdonald, in his Notes in 1876 on the district, rather pleaded for an extension of grazing, in the interests not only of the land, but to enable the farmers to keep more stock in summer. But the old system is still very closely adhered to, and does not seem likely to be very readily given up. Even yet it is possible to travel for miles in this district during the summer months without seeing a single animal of the cattle or sheep species, except it be a few cows kept for supplying milk on the different farms.

In addition to the lower prices which have been realised for potatoes of late years, a serious drawback to their continued extensive growth in the district, particularly on the coast, is the trouble with disease. Last year, on account of the dry season, there was no difficulty on this score at all, but in most of the preceding years it accounted annually for a good deal of loss. Whether it be due to the land being sick of potato-growing, or to some other cause or causes, is not known; but it is often a peculiarity that while one-half of a field may practically be all right, the other half may be all but decimated with the disease.

So far as treatment of the land is concerned, stubble

manuring for the potato crop break is now an all but universal custom. The manure is put on in the back end as far as possible at the rate of about twenty to twenty-five loads per acre. On the shore farms sea-ware is still very generally used in augmentation of farmyard manure when it is obtainable, the ware where used alone being put on at the rate of thirty to forty loads per acre. In addition to the farmyard manure or ware, the potato-break generally gets in spring about 5 cwt. per acre of artificials, a very general mixture being 2 cwt. superphosphate, 1 cwt. sulphate of potash, 1 cwt. sulphate of ammonia, and the same quantity of good Peruvian guano. This mixture can be varied to suit circumstances, and in a slightly altered form is also very generally used for turnips.

As a rule seed potatoes are planted whole. Many of the potatoes grown in this district on the red land are as red as the Dunbars, and as a matter of fact are often sold in the London markets at as good prices. They have the same recommendation as the Dunbars, in that they both boil and keep white for a considerable period of time. Crops in the district vary from 5 tons to 10 tons per acre, a pretty general average being about 7 tons. With these yields the crop did well enough when prices were about £3 per ton, but lately, when 50s. and less was a more common figure, the crop has not been so profitable.

Most farms in this district—and this applies pretty well round the coast to Elie—grow now as many acres of turnips as they do potatoes. In the case of turnips most of the dunging has to be done in the drills. The difficulty in the district is to grow sufficient straw to make manure. With such a large quantity required for the potato-break, the turnips have usually to depend on freshly made manure, and this naturally necessitates drill dunging. The artificials used for turnips are mainly nitrate of soda and superphosphate in varying quantities. The turnips are mostly eaten on the farms either with cattle in the winter months or with sheep. The latter are usually folded only on the light lands, the clays being liable to be injured by too much puddling in wet weather. Owing to the difficulty of want of fencing, farmers as a rule let out their sheep turnips in preference to keeping sheep themselves. When prices justify it, considerable quantities of turnips are sold to go to dairymen and shopkeepers in Dundee, Edinburgh, and Glasgow. As a rule, in this district there are no restrictions on the sale of any kind of crop except straw, and even in the case of straw a farmer has now a statutory right of sale so long as a manurial equivalent is returned to the land. The hay grown in this

rotation is usually Italian and perennial ryegrass and red clovers. The Italian is favoured in many districts, particularly towards the Tay boundary, where there is easy access to the Dundee markets. The seeding used for this crop is usually $1\frac{1}{2}$ bushel Italian ryegrass, 6 lb. red clover, and 2 lb. alsike. Where alsike is sown it is mainly to give a bigger bulk in the second cut. About 2 cwt. of nitrate of soda is applied to the hay crop about the middle of April; in cases an extra cwt. is given later on, but not as a general rule. As much of the first hay cut as can be spared is sold; the remainder and most of the second crop is used for the horses and for cattle-feeding. In this class of farming oats are frequently top-dressed. Some apply superphosphate with the seed and give a further dressing of at least one cwt. of nitrate when the braird is up; others only apply nitrate of soda. Barley as a rule is not top-dressed. A good many of the coast farmers in this neighbourhood collect the turnip-tops and apply a proportion of them as a manure to the potato-land. The reason of this is that the barley would grow too strong, and might get down, were the turnip-shaws left.

A Dairy Farm in East Fife.

Time was when there was not a single dairy farm in the St Andrews district. Very little milk was consumed in the town, and the needs of the citizens were fully met by cows that were kept in byres within the boundary of the burgh. In those days—less than half a century ago—there were no milk-carts to be seen, and milk was either bought at the little dairies, or was distributed from door to door by messengers. Gradually with the decline of prices for grain and other farm produce the custom changed. First one small farmer and then another began to find out that there was a good profit in the milk trade, and little as he liked the early hours and the endless labour, he found that if he wanted to make a living on his farm it must be by milk-selling and not by grain-growing. Larger farms followed suit, and now there are many excellent dairy farms well stocked and well equipped in the neighbourhood of St Andrews.

Let us take as a sample a farm that has been in the trade only within the last ten years. It is 300 acres in extent, and the land is of fair medium quality, rented at 27s. 6d. an acre. The fields are all enclosed, and are mostly well sheltered by plantations or large hedges. The farm is bounded on three sides by running water. There are some outlying pasture lands belonging to a neighbouring farmer that can be rented, and in short it is an excellent farm for grazing. It lies back

from the sea not more than a mile and a half, and is about 270 feet above sea-level, but has nevertheless the disadvantage of being rather late. The steading has recently been overhauled and added to, and the accommodation is good. There are three stables for eleven horses, and five byres with stalls for 126 cows. One of the byres—with eight stalls—is completely isolated from the others. The main byres have been fitted up in the old cattle-courts, and the original byres on the farm have been brought up to date in the matter of equipment. Recently a new building to hold 42 cows was added by the tenant himself under a special agreement. All the byres are laid with concrete in the usual manner, and it may be noted that this part of the work, except at the very beginning, was done entirely by the unskilled labourers on the farm, and cost not much more than half of what it would have done at the ordinary charge of a tradesman. Yet the work is as well done in the one case as in the other.

The cubic contents of the byres run to an average of about 850 feet per cow, and there is the ordinary ventilation, so that the cows are oftener troubled with cold than heat. The cows kept are of no particular breed. Indeed most breeds and most crosses have their representatives in the herd. Milk records are taken at every milking, and monthly averages entered in a book specially prepared and printed for the purpose. In this way good cows are selected and kept on, and indifferent milkers speedily got rid off. Two bulls are in use, one a pure Guernsey and the other a shorthorn, both being from carefully selected milking strains. From twenty to thirty heifer calves are reared every year, and from these the best are kept for cows. The young cattle are grazed, and many of them wintered on another farm rented by the tenant. On this farm yeld cows are also kept, and in this way a greater quantity of milk can be produced on the dairy farm. Except during the months of May, June, and sometimes July, the cows are given artificial feeding-stuffs in addition to what is grown on the farm. These vary according to market prices and the season of the year, and include cotton-cake meal, soya-bean cake, and meal, draff, treacle, &c. The feeding is fairly liberal, the bought stuffs averaging about £5 per cow per year.

The farm itself is run wholly with a view to the production of milk. The most suitable fields for pasture are kept for that purpose, and the other fields are worked on the fourth shift. No potatoes are grown, all the available land being required for turnips. In order to meet the ravages of finger-and-toe, which would otherwise result from such close cropping, a good deal of ground lime is used—one ton per acre being applied at a time, generally on the ploughed fields, before they are worked

for the turnip crop. The whole fodder that can be grown on the farm is used, and what else is required is bought in. The milk is sold by retail—two carts being sent in to St Andrews every day in the week, and one of them going twice. The general price in the town is from 1s. 2d. to 1s. 4d. per gallon, and the demand often exceeds the supply.

As the cows in the herd include Jerseys, Guernseys, and many of their crosses which are stronger, healthier, and often give as rich milk as pure-bred Island cattle, the quality of the milk on the whole is maintained at a high standard. In this herd the milking machine was in use till very recently, and seems on the whole to have given satisfactory results. The tenant, however, has come to the conclusion that it is not altogether suited to a retail milk trade. Occasionally during the milking, or just at the beginning, some slight defect in the oil-engine that drives the air-pump would make itself manifest, and then the whole operation had to cease. This was seldom the case when a really capable man was in charge; but if, as sometimes will happen, a careless byreman had command the results were intolerable. Punctuality in the delivery of milk is essential in this trade, and with machines that could not always be ensured. The milking machines themselves need a first-rate man to keep them right, and such a man is not always to be had.

Inland Conditions.

Directly inland towards Cupar, and again to the north on the Tay boundary, pretty much the same style of farming prevails as is favoured in the St Andrews district, except that the rotation is usually lengthened out by one or two years' grass. Potatoes also form a much smaller area of the green crop break than they do in the St Andrews district, while turnips are naturally increased. Most of the land in the inland districts is fenced, and more suited for the keeping of stock. A very common rotation in the Cupar district is—hay, pasture, oats, potatoes, wheat, turnips, and barley or oats sown out. In cases where an extra year's rotation is followed, it is effected by adding another year's pasture. This latter rotation has been adopted in several instances of late years, principally with the object of saving the labour bill. It has also been found convenient in recent years in connection with developments which have taken place in dairying, many of the district farms now keeping considerable stocks of cows as part of their permanent establishments. The smaller dairy farms cater mainly for local requirements, while the larger ones depend for most part on Dundee as an outlet for their produce. In almost all cases the trade done is exclusively in sweet milk, which is

found to pay better than making butter. A little cheese is made on one or two farms.

A Typical Cupar Farm.

Apart from those devoted to dairying, there are many fine mixed and feeding farms in the Cupar district. A short sketch of management on a typical farm of this class, about four miles out, must suffice as a sample of many others. This farm extends to about 400 acres, and is managed partly on a five-shift and partly on a seven-shift rotation—on the five-shift on the fields where no potatoes or wheat are grown and where no hay is cut, and on the seven-shift where all these are grown. The five-shift rotation consists of pasture, pasture, oats, turnips, and barley sown out, while the seven-shift rotation consists of hay, pasture, oats, potatoes, wheat, turnips, and barley sown out. The object of this management is to grow wheat and potatoes only on the best land, and to keep the turnip-crop rotation as far from the next turnip rotation as possible to prevent finger-and-toe disease. A full stock of cattle and sheep is kept on the farm. The grieve on the farm works with the women-workers, the foreman working the first pair of horses and guiding the men. There is a cattleman for his department, and a shepherd for his department,—this being a pretty general method of working in the district. Threshing takes place as straw is required. Turnips are stored, but are not “sheuched,” as is the case in Forfarshire and Perthshire. The method of storing is, when fed to sheep on the field, in circular pits, each containing two loads. These pits are equally distributed over the entire field. When required for cattle, the turnips are put in oblong pits, two loads a-broad. Since the North of Fife Railway was opened, the area of potatoes grown on this farm and in the district generally has been increased and the turnip-break reduced. There is no “sprain” troubles in this district, and not much trouble as a rule with general potato disease. The whole green crop, unless in a year of short straw, and with the exception of the steep outlying fields, is dunged on the face, as the dung is available, from the autumn till the beginning or middle of March, the allowance being from 12 to 15 tons per acre. This is helped in the spring by from 6 to 8 cwt. of artificials, according to the condition of the field or fields. From one-half to three-fourths of the turnips are taken off the field for the use of cattle, the remainder being eaten on the ground by sheep. On the high-lying fields which receive no dung only one-fourth of the turnips are taken off for cattle, and sometimes the whole turnip crop there is eaten on the ground with sheep.

Thus the three-fourths of turnips taken off the seven-shift rotation, and the one-fourth taken off the five-shift rotation, equalise the turnips used for cattle and sheep. As the north of Fife is specially adapted for barley-growing, a considerable breadth of this cereal is grown every year. Formerly North of Fife barley used to command as good a price as East Lothian barley; of late, however, there has been a slight difference in favour of Haddington-grown grain. The potato-break is treated pretty much as the turnips. Labour is done as a rule by the ploughmen's wives or daughters. At busy times—such as turnip-thinning and storing—Irish labour is drawn upon, this being usually always available at these seasons.

The land generally in this neighbourhood is not inferior to that to be found on the coast district, the difference being mainly one of climate and in cases a greater distance from markets and railway facilities. This difference is well reflected in the relative rents which the land commands, for while in the immediate coast districts rents run from 35s. to 48s. per acre, they do not exceed 25s. on the average in the inland flat districts, and on the higher parts of what is known as the "riggin' of Fife" they go as low as 10s. to 12s. per acre. On these latter higher-lying lands grazing and stock-raising forms an important consideration—much more so than pure cropping or even cattle-feeding. On the flatter lands, however, where dairying is not followed, cattle- and sheep-feeding in conjunction with cropping still forms the staple line of farming. The arable farms in the district are worked on pretty much the same lines as in the St Andrews district, stubble manuring in the back end being generally followed.

Taking at least one year's pasture and sometimes two, the farmers have also to sow somewhat different mixtures of grasses. A pretty general mixture in the Cupar neighbourhood for one or two years' pasture is $\frac{1}{2}$ bushel perennial ryegrass, 8 to 10 lb. Italian ryegrass, 3 to 4 lb. cocksfoot, 3 to 4 lb. timothy, 3 lb. meadow fescue, and 8 to 10 lb. of clovers. For pure hay, Italian ryegrass is preferred without the natural grasses, while a little perennial may also be used. The hay is usually top-dressed with from $\frac{3}{4}$ cwt. to 1 cwt. nitrate of soda in the spring. Most of the second crop is usually eaten on the land by sheep or lambs—either bought directly or taken in from other parties. White crops in this district are not top-dressed as a rule, except wheat, which may occasionally get a little nitrate or other light manure, so as to stiffen the straw. The cattle fed in this district are mainly either Irish or bought in from the higher-lying district farms. The staple feeding is of course turnips and straw, supplemented by linseed and cotton-cake—the cotton-

cake being usually used to start with, and the linseed added as the animals get on in the fattening process. The usual allowance of cake is 4 to 5 lb. daily to begin with, rising to from 8 to 10 lb. as they get nearly finished. Of late years, many farmers in their efforts to keep down the cake bill have taken to feeding hay to their cattle, particularly towards the finishing period. This answers very well when hay is reasonable in price, and has been particularly useful this past winter owing to the rise which there has been in the prices of all kinds of feeding-stuffs.

Tay Boundary.

The system of farming does not vary a great deal along the northern boundary of the Tay from what we have been describing in the inland districts about Cupar, except that there is still more grass and more grazing of stock. In this district many of the farmers have steep hill-set land which lies in grass for a considerable time and is worked on a much more open rotation than the shore lands. Some of the shore lands in this part of the county are very fertile, but they are much narrower than on the south or Forth side, and the exposure of course is not so good. All the same, many most superior crops of potatoes, cereals, and roots are grown. Taking a line up the Stratheden valley towards Auchtermuchty, many fine farms are passed, rotation farming on pretty much the same lines as in the Cupar neighbourhood being followed. As one approaches Falkland, the residence and property of the popular young president of the Society, Lord Ninian Crichton Stuart, M.P., the land gets very flat, the district having evidently at one time been the bed of a lake. Indeed between Freuchie and Auchtermuchty there is a stretch of nearly five miles, but so little does the plain rise that even ten miles farther west it is less than 200 feet above sea-level. Since he came into possession at Falkland, Lord Ninian Crichton Stuart, cordially backed by his popular factor Mr George Gavin, has carried out a number of valuable improvements on the property. An important one from a farming point of view was the installation of a herring-bone system of drainage for the drying of a low-lying and rather damp part of the estate. Four-inch tile pipes were used for the wings and a ten-inch pipe for a tail, while a twelve-inch pipe was used to carry the outfall away a considerable distance through a portion of an adjoining estate. The expense was considerable, but the drainage has acted like a charm, and while this particular part of the property could hardly before be cultivated in wet seasons on account of the horses sinking in it, it is now quite dry and can be worked under any conditions. Indeed the first year

after the drainage was put in, one of the tenants grew a crop of 10 quarters of oats on land which was before of little value comparatively, especially in a wet season.

Two splendid farms on the Falkland estate adjoin each other—Falkland Wood, occupied by Mr Shanks, and Woodmill, occupied by Mr George Dun. The first-mentioned farm extends to 600 acres arable, and is worked on a fairly easy eight-course rotation—viz., hay, two years pasture, oats, potatoes, wheat, turnips, and barley—the latter sown out. The land varies a good deal in quality, but is mainly good sharp cropping land, some of it, however, being rather light. On this account wheat is not taken on every field as it comes in the rotation, while on the other hand oats are often substituted for barley on other fields, and the grass sown out with the oats. Cattle- and sheep-feeding and grain-growing form the staple enterprises on the farm. The cattle, while we were there, were getting up to 14 lb. of hashed rye, barley dust, and Bombay and Angus cakes mixed, in addition to what turnips and straw they would eat. During the last month hay is usually substituted for the straw. Mr Shanks has an excellent steading, and it was interesting to hear that since he had put in an oil-engine to drive the threshing-mill he had been able to reduce the cost of threshing (exclusive of course of first cost) to about £8 per annum, as compared with £60 when a travelling steam threshing-mill had to be employed.

Dealing with Light Land.

A very up-to-date method of farming is also followed on the adjoining farm of Woodmill, which has also a finely appointed steading. About a third of the land on this farm, which extends to 460 acres, is very light, the balance being sharp “clever” land, and some of it mossy. Some of the light land is so light that occasionally Mr Dun has had turnips blown out after being singled, and grass seeds blown away after being sown. His method of dealing with this land when it comes under the plough is rather novel. Instead of turning it over in one furrow he employs two ploughs—one skinning lightly ahead of the other. That is to say, the first plough turns over perhaps a couple of inches from the top into the preceding furrow, while the other turns over the remaining four inches or so on to the top of the skinnings. The subsoil being fairly firm, this he affirms not only consolidates the land through the rotation, but makes it much easier drilled and worked. After the land is skinned and ploughed in this way, two green crops are taken in succession—first potatoes and then turnips. Rye is then taken after turnips, and the land is then sown out again and

lies for five years. A wrinkle which Mr Dun has learned in sowing out with rye is that much the best result is obtained when the grass seeds are sown at the same time as the rye in the spring. When the grass seeds are held back until the braird is above ground the strong growth of the rye is apt to choke them out. On the other parts of the farm, where the land is "bodier," two white crops are taken in succession on one part—the best part of the farm—to equalise the two green crops taken on the light land, while the remaining portion is worked on an ordinary rotation—potatoes, oats, turnips, barley, and sown out. The light land lies in grass at least three years, so that it is in fairly good heart again before it is broken up.

Another novel plan which the tenant of this farm follows is to grow turnips and potatoes on different parts of the same field in two successive years, but in the reverse order. Thus the turnip part one year will be potatoes next. Where the turnips are not dunged the second year sheep are fed on them, so that the land is twice dunged in two years.

Mr Dun feeds large numbers of cattle and sheep, the cattle being mostly bought in Irish lots. So far as the cattle are concerned, generally speaking the plan followed is to feed the best of the cattle wintered on the farm on the grass and sell during July and August. The other portion, along with what may be bought in, are grazed on the poorer land, housed in October, and sold about New Year. In the autumn, feeding and wintering cattle are bought to fill up the requirements of the farm. The ewes bred from are ordinary first-crosses and Cheviots. The former are drawn from cross lambs bought in, are grass-wintered, and put to Border Leicester rams the following autumn along with the Cheviots. The next and following crops of lambs from the cross ewes are sired by a Shropshire tup. Maize germ-cake, and cotton-cake are Mr Dun's usual standard artificial foods, the cattle towards the finish getting up to 10 lb. per day in two feeds of 5 lb. each. The two-year-old cattle get about 70 lb. of turnips each, and straw *ad lib.* About 40 acres of potatoes are grown on the farm every year, which means much carting. The horses are mainly bought as two-year-olds, and are kept on until they are fit for work. As they get stiff they are weeded out and replaced by younger ones, one old horse as a rule going every year. Both Mr Shanks and Mr Dun have benefited greatly by the system of drainage which was carried out by their generous proprietor two or three years ago. The seven-course shift is the general rotation followed in this district, the order being hay, pasture, oats, potatoes, wheat or oats, turnips, and barley. Very little dairying is followed in this particular part of Fife, and the rent of the land averages about £1 per acre.

Plain of Fife.

Pretty much the same style of farming prevails on the great plain of Fife—to the south of the Lomond Hills and the west of the hills of the East—as is followed in the St Andrews district. Wheat, oats, barley, and potatoes are all grown in considerable quantity, while there is also here a good deal of dairying, especially sweet-milk production, much of the populous summer coast district being included in this area. Another important farming district is reached in the Markinch district to the west. Here the prevailing system of rotation is still the six-course one, with in cases an extra year's grass thrown in. The pure sixth-course followed is oats, green crop (potatoes or turnips), barley, hay, and pasture (two years). Where a seven-course system is followed it is obtained by letting the grass lie for three years. Another rotation followed on some farms in this neighbourhood is as follows: oats, potatoes, wheat, turnips, barley, and hay. This course gives two dungings in the rotation, and is fairly extensively followed on some of the most intensively worked farms.

In the Kirkcaldy district we touch the little suburban farming that there is in Fifeshire. It is, however, by no means so extensive as it is in the Edinburgh district on the other side of the Forth, consisting for most part of the production of crops suitable for milch cows. With the linoleum works and other industries, there is a big population in this district, and consequently a great demand for milk. Most of the farmers keep a regular stock of cows as part of their equipment, and several of the farms are almost wholly devoted to dairying purposes. There are no more successful or enterprising farmers in this district than the Messrs Meiklem, who farm upwards of 1000 acres of arable land in the locality, and a short outline of their system may not be out of place here.

“Bowling” and Dairying.

In all, the Messrs Meiklem have four farms in this neighbourhood, three of which are wholly arable. The fourth is maintained largely as a grass accommodation farm in conjunction with the other farms. On each of the three arable farms a stock of cows—they have 130 dairy cows altogether—is kept under what is known as the bowling system. This is a system which is well known in the south-western districts of Scotland and in some other parts, but so far as could be learned the Messrs Meiklem are the only farmers who adopt it largely in Fife. The cows under this system are let to a bower at so much per head, the farmer

contracting to keep up the stock and supply all the feeding-stuffs required—that is, all the natural farm-grown feeding-stuffs. He also as a rule contracts to supply a certain quantity of artificial feeding-stuffs per cow per year. Some dairymen who wish to do their cows even better than the farmers' allowance justifies, give a greater quantity of feeding-stuffs, but these they supply themselves. At Begg, Muttonhall, and Dunnikier, three of the Messrs Meiklem's farms, this is the system that is followed. The farmers keep up the stock of cows, supply all the natural food and an allowance of artificial foods as well. For the rest the dairyman looks after the cows, and sees to the handling and the sale of the milk. The rents obtained under this system range from £16, 10s. to £19 per cow, the farmer providing turnips and straw *ad lib.*, about half a ton of bean-meal per cow per annum, and about a ton per cow of draff. No hay is allowed under this system unless specially bargained for. Milk prices in the Kirkcaldy district run from 1s. to 1s. 2d. per gallon retail—wholesale, about 9d. all the year round.

To fit in with the dairying work, the Messrs Meiklem work their farms on a fairly intensive system, which, however, is pretty generally followed in the district. Substantially their system is a four-course one — oats, green crop (potatoes and turnips), wheat or oats (wheat on the potato land and oats on the turnip land), and ryegrass hay. In late years, like some other farmers in the district, they have adopted the principle of sowing a mixture of ryegrass and timothy in the last year of the rotation and cutting it for two or three years. The advantage of this system is that in addition to resting the land, it provides a double dunging in the course of the rotation, the ryegrass-timothy hay being always dunged before being cut in the second year. Of course it is not every land that will suit timothy hay growing. The most favourable is clayey or mossy land, but the former is fortunately or unfortunately fairly plentiful in the Kirkcaldy district, and on most farms a proportion of timothy is now grown. So far as ryegrass is concerned, the old custom in the district was to sow half Italian and half perennial. Unless where the land is to be grazed the habit now is to sow two-thirds Italian and only one-third perennial. On the timothy system of working, the usual thing is to sow from 12 to 20 lb. of timothy per acre along with about 1½ bushel of Italian ryegrass. Clover is almost invariably sown the first year to mix with the Italian. There is a good market for timothy hay in the Kirkcaldy district, and it is largely grown. It is dunged after the perennial year, and is then top-dressed every year it remains in growth with nitrogenous manures. .

Being largely clayey the green crop land has to be carefully handled. It is ploughed early in the back end with the view of its getting whatever frost is agoing. Then in the spring it is not ploughed again, but is cultivated so as to leave the frosted surface as near the top as possible. Experience proves that this gives in the district a better tilth and a better braird than when the land is ploughed a second time in spring. All dung made up to the New Year or thereby is applied to the surface either for potatoes or turnips; whatever is made after that goes into the drill, this being the common *modus operandi* in the district. Potatoes in this locality are largely sold by the acre, although, of course, a good deal depends on prices at the time. The Messrs Meiklem keep a fine stud of Clydesdale horses, and they have also small herds of both Aberdeen-Angus and short-horn cattle, and a flock of Border Leicester sheep. Their enterprise has found vent within the past year in the introduction, at their chief farm of Begg, of an installation of electricity for both lighting purposes and driving their threshing and other machinery. Not only the dwelling-house, but the steading is now lit by this means—the steading, we believe, being the first in Fife to be thus equipped. The power is got from the Fife Electric Power Company, which operates various tramway lines in the district, and has shown a good deal of enterprise in making their trunk-wires available for purposes of this sort. The first cost to the Messrs Meiklem for the whole installation is understood to have been about £100. They are rated by metre after that, but already it has been ascertained that the cost of threshing, bruising, and cake-breaking by the new power does not exceed 4d. per running hour.

West Fife.

No part of Fife is more interesting from a farming point of view than the western division stretching from Kirkcaldy to the extreme limit of the county near Torryburn. This stretch of country contains some of the deepest land in the shire, and as already indicated it grows some of the finest wheat produced in the county. Although there are variations, many of the farms in the west of Fife are worked, like those in the Kirkcaldy district, on the four-course shift. This is particularly the case in the Inverkeithing and Dunfermline districts, where the land is suited for wheat growing. On the higher-set farms, where a variation is made from the four-course shift, it is usually in the direction of an extension to one or two years' pasture. At Waulkmill, which is one of the most representative and best-managed farms in the Torryburn district, Mr Millar, who is both proprietor and occupant, works on a six-

shift course, consisting of hay, oats, potatoes (with beans on the very stiff land), wheat, turnips, and barley sown out. The land of this farm slopes right down to the Forth, and is quite close to the new Naval Base at Rosyth; indeed, part of the service railway land came off Mr Millar's farm. Mr Millar is somewhat different from some of his neighbours in that he does not dung his potato land, but puts the whole of the dung on to the turnip-break. The method he follows of grading up the potato land is to feed sheep on the second-crop hay in the immediately preceding crops. Mr Millar has introduced quite a number of improvements at his well-appointed steading, and at an adjoining farm which he rents has utilised falls and slopes in the ground above the steading in quite an ingenious way for forming shoots for threshing, straw-foddering cattle, and matters of that sort.

A somewhat similar system of farming is pursued on the neighbouring farm of Crombie, except that the rotation is lengthened by pasture, Mr Beveridge being an enthusiastic breeder of Border Leicester sheep. Many fine farms lie in the valley between Rosyth and Dunfermline, and even to the south-east of that town there are also many splendidly managed holdings, one of the best being Masterton, occupied by Mr Buttars. This farm is entirely devoted to cropping and cattle- and sheep-feeding, Mr Buttars having a reputation in the district second to none for turning out highly finished fat cattle and sheep. The south part of the farm is rather brae-set and thin, but there is much good land on the flat which grows large crops of wheat. Mr Buttars keeps a fine flock of Border Leicester sheep. There is a good deal of dairying in the Dunfermline district, the Co-operative Society carrying on a large business in fresh sweet milk, while many other farmers in the immediate neighbourhood of the town do the same. Retail prices are about the same as in the Kirkcaldy district—viz., from 1s. to 1s. 2d. per gallon. Further east, at Dalachy, Aberdeen, Mr David Cunningham makes a speciality of raising considerable numbers of store cattle every year, and thus making himself independent to a large extent of the Irish dealer.

Early Potato-growing.

No account of Fife farming would be complete without a reference to the system of early potato-raising which was introduced a few years ago by the Messrs Burns at Rosyth. Potatoes, of course, have been grown in Fife for years without number, but no one in the county had ever before made an attempt to grow very early ones to compete with the Girvan shore farmers of Ayrshire. Mr Burns, senior, was led to take

up this enterprise through the knowledge he had gained (as a potato-merchant himself) of the early Ayrshire trade. Seventeen years ago, when the shore farm of Rosyth came into the market, he took a lease of it from the late Marquis of Linlithgow, and at once tried the experiment of growing very early potatoes on the shore fields. The attempt was so successful, that up to the time, three or four years ago, when the Admiralty acquired the shore part of the farm for the purpose of their Naval Base, the Messrs Burns were able to begin digging about the 28th of June. This was a few days later than the very first of the Ayrshires, but it was still early enough to have the potatoes into the thick of the very early trade. Since losing the shore part of Rosyth, the Messrs Burns have taken another farm on the East Lothian coast, where they are carrying on the same system of working. This farm, which is largely of a sandy nature, is even earlier than Rosyth, and promises to run Ayrshire very closely. They have also adopted a second early policy on other farms which they hold to the immediate south of Dunfermline.

The procedure followed in the growth of the early potatoes at Rosyth was as follows: Immediately after the potatoes were dug, in the last days of June and early days of July, the land was sown out with rape, which was eaten with sheep. Towards December it was heavily dunged on the surface and ploughed, the dressing applied ranging up to 20 tons of farmyard manure per acre. Sea-ware, which was found on the beach, was also used for this and other manurial purposes, an even large quantity of this being applied. Two or three years ago the Messrs Burns and other district farmers who had their shore accesses taken away had an historical arbitration with the Admiralty, when the value of the ware was fixed at about 5s. per ton. The ploughed land was left dormant until the early spring, when it was grubbed and harrowed two or three times to get a good tilth. Planting usually began about the middle of February, sprouted whole seed being used. This seed was specially sprouted in well-lighted, artificially heated houses, and by planting-time would have a tough growth of probably two inches in length appearing upon it. The potatoes were always carefully planted by hand, and usually appeared above the ground in about a month after being planted. The varieties used for this purpose were Epicures and British Queens, the former being also one of the popular early sorts in Ayrshire. In addition to the farmyard manure, the crop got about 12 cwt. of a special artificial manure in which potash naturally predominated. As a rule the crop lifted under this system averaged about 8 tons, according to the season. Prices depended upon the state of the market at the time, but one year as much as £48 per

acre was realised for these shore-grown potatoes. Early potatoes were only grown on the same land every second year, an outside crop, usually wheat, being taken in the intervening year. The land, seeing that it had rape fed upon it, and that it was dunged every second year, remained in first-rate heart and never failed to yield a big crop. That the enterprise is an expensive one may be judged from the fact that the Messrs Burns dunged their East Lothian farm from end to end (220 acres) this past back end with a dressing of not less than 25 tons per acre. For weeks they were dealing with 15 waggons of manure a-day received from Edinburgh.

Labour.

Whatever coal-mining may have done for farming in other directions in Fife, it has certainly not helped it from a labour point of view. The pits form a constant source of attraction for young able-bodied men, and to retain these on the land farmers have to pay high wages—higher perhaps than in any other part of the East of Scotland. In the West of Fife, for example, first-class ploughmen command from 20s. to 22s. per week with a free house. No other perquisites, as a rule, are given in West Fife. In the Eastern districts, however, perquisites are still given. Here a very general wage for a first-class man is £38 to £42 a-year, with one pint of sweet milk daily, half-boll of meal monthly, and about two tons of potatoes and a free house, the perquisites, including house, being of the annual value of £15 to £20. Counting everything, a first-class man in East Fife will make 24s. per week all the year round. Second men get so much less in proportion, while female workers get 1s. 4d. to 1s. 6d. a-day at ordinary times, 3s. per day in harvest, and 2s. 6d. per day at potato-lifting. In harvest the men get extra consideration in the way of “baps” and beer, or 12s. in money, so that, as will be seen, they are well paid. Another feature about Fife farming which does not apply in many other districts, is that the workers only work nine hours per day, as against ten hours in East Lothian and most other arable farming districts of the South of Scotland. In Fife the working day begins at seven o'clock and goes on until twelve o'clock, when there is a two hours' break for dinner and rest. The afternoon extends from two o'clock to six o'clock. In most other districts the agricultural day is six to eleven o'clock and one o'clock to six o'clock. It does not seem to be known what is the cause of the difference in Fife. Probably something may be due to the stiff land of the county being heavier on horses than it is in some other parts, but most would no doubt be due to co-operation and give and take between masters and their men. It is the fact that in Fife

farmers as a rule are more closely in touch with their men than they are, say, in the Lothians, and they affirm that as much work is done in Fife in the nine hours as is done in other parts in ten hours.

Pedigree Stock.

At one time Fife had a good reputation as a pedigree stock centre. Twenty years ago there were quite a number of good pure-bred herds in the county, the Naughton herd of Aberdeen-Angus cattle, near Tayport, being one of the best in the country. At that time the Cupar District Show was always sure to have a very good representation of both shorthorns and Aberdeen-Angus. Of late years the cattle sections at the county shows have not been nearly so outstanding. A number of the herds have been sold off, and others have given up showing. The principal shorthorn breeders in the county to-day are Sir John Gilmour, Bart., in the Leven district, Lord Balcarres in the Colinsburgh district, and Messrs Meiklem in the Kirkcaldy district. The latter, as already stated, also keep a few black cattle, but, excepting for these gentlemen, and Mr Wallace of Halbeath, there are very few in the county now who keep Aberdeen-Angus. The old Fife breed, which is so frequently referred to in histories, has long since ceased to exist. The county keeps up its reputation well in the matter of sheep, there being quite a number of Border Leicester flocks in Fife in addition to those at Crombie and Masterton already mentioned. At Rossie, in the Auchtermuchty district, Messrs Brown are enthusiastic breeders. At Lochty, in the Pittenweem district, Messrs Mitchell have a nice flock, while the same may be said of Messrs Pollock in the Largoward district. The President of the Highland and Agricultural Society, Lord Ninian Crichton Stuart, M.P., has also started what promises to be a capital flock at Falkland, his principal stock ram at present being the great sheep His Majesty (2317), whose stock realised such high prices at the Galalaw sale in September 1911, and which was himself sold at the sale at the record price for a four-shear of £140. Another very good county flock of this breed is owned by Mr White, Collydean, in the Markinch district, while there is also Mr J. B. Tulloch's flock in the Inverkeithing district. Blackfaces have a capital exponent in the county in Mr Angus Grieve, Ladybank, whose exhibits may always be counted upon to hold their own wherever they are shown, while Sir John Gilmour also keeps a small flock and annually brings out many "crack" pens of wedders of the breed at the leading Christmas shows.

But satisfactory as sheep as a county product continue to be, the most remarkable live-stock development in the district

of late years has undoubtedly been the great increase which there has been in Clydesdale horse-breeding. The interest in this particular branch of enterprise may be said to have been quadrupled in Fife within the past few years. Whereas some years ago at county shows it was the custom for light horses to outnumber the heavy ones, it is the other way about now. The heavy sorts are now greatly in the majority, and interest in them seems to be increasing. The brisk state of the foreign and colonial market of late years has been a source of great strength to this trade, and there has also been, notwithstanding motor development, a good demand for lorry horses at home. Both of these influences have served to concentrate attention upon heavy horse-breeding. There are now in the county at least six horse-breeding societies, three of which are associated with the Fife Agricultural Society. These latter are the Cupar and North of Fife Horse Breeding Society, the Windygates Horse Breeding Society, and the Central Fife Horse Breeding Society. The latter society has at present a premium provided for it by the generosity of Lord Ninian Crichton Stuart, M.P. Each of the societies provide a first-class horse for their district at terms which places the animal within the reach of even the smallest owner. In addition to the societies associated with the Fife Society, there is in the extreme east of the county the East of Fife Society, which also engages a horse for its district, and in the extreme west the Dunfermline and West of Fife Society. In the Kinglassie district there is the Kinglassie Society, which likewise hires a horse every year for the benefit of the district and its members. The principal pure-bred county stud is that at Montrave, Messrs Meiklem also, however, being comparatively extensive owners.

A few half-bred hunting horses still continue to be bred in the county, notably at Abercrombie and Montrave; and one must not forget the consequential little Shetland pony which is represented in Fifeshire by two of the finest studs in the kingdom—that at Earls hall, in the extreme east, owned by Mr W. R. W. Mackenzie, and that at Transy, near Dunfermline, owned by Mr W. Mungall. Both gentlemen have been enthusiastic district breeders of the popular little Shetlander for years, and both are experts in this particular line.

County Societies.

The county is well served by agricultural societies. A few years ago there were five fairly big such organisations in Fife, but the number is now four—the Fife Agricultural Society, the Colinsburgh Agricultural Society, the West of Fife Society, and the East of Fife Society. It is more easy suggesting

it than getting it carried out, but we cannot help thinking that a little more concentration yet of this class of effort would be of advantage all round. The Fife Society has done greatly enhanced work since it was amalgamated with the Windygates Society.

Changes in Methods.

Changes in modern Fife farming, in addition to those already noted, include a rather more extensive use of the drill on light land for sowing purposes than was formerly the case. In many cases, on such land, the drill is now much preferred to broadcasting the seed. The latter is the speedier method of the two, but the drill covers the seed up better and ensures as a rule a better braird. Moreover, there is a saving of seed with the drill. Steam-ploughing, which was a good deal in vogue in the county thirty years ago, has now all but ceased to exist. A few of the very big farmers still adhere to this method of cultivation, but generally the average farmer continues to stick to the humble *equus*. A really efficient light motor tractor would take well in Fife, and would no doubt command a ready sale. Another matter in which one notes minor changes in the county practice of late years is in the gradual increase of Italian ryegrass in the hay crop and the gradual reduction of perennial, the former, of course, giving the larger bulk. Stack-building in Fife is carried on on a somewhat different principle from that which prevails, for example, in the Lothians. In Fife they slant the layers of sheaves more than they do in the Lothians, so as to facilitate quick drying. This seems to be a peculiarity of the county, but it is a practice which gives good results and is widely followed in the peninsula.

The farmers of Fife are a shrewd, capable class of men, who give close attention to their business, and have converted what in many parts is only a very moderate farming subject into one of the most productive counties in Scotland.

FARMING METHODS IN THE WEST OF SCOTLAND.

By ARCHIBALD MACNEILAGE, Editor and Manager of 'The Scottish Farmer,' Glasgow.

THIS paper forms the last of a series describing varieties of farming methods followed throughout the Glasgow Show area, which embraces the western shires. In the previous articles have been described methods pursued on typical farms on the

mainland—in Lanarkshire, Renfrewshire, Dumbartonshire, and Ayrshire, and in the Island of Bute. The information embraced in the following notes was collected at the same time as that already published, that is, during the winter of 1905-6, and applies to farms in the Island of Arran and in Argyllshire. The details have not been seriously modified during the intervening years, but there have been some changes in occupancy. These, however, do not alter the value of the information conveyed, or its utility for the reader now.

ARRAN.

The greater portion of the Island of Arran is the property of the Marchioness of Graham, and the three large farms described in what follows are all on her estate. The island is famous for its geology and as a summer resort: but these things do not specifically concern us here.

The popularity of Arran as a temporary residence for tourists, of course, has an important influence on its rural economy. There is a great demand for sweet milk and other dairy products during July, August, and September, and in consequence the Ayrshire breed has supplanted all other cattle on the island.

Dairying and Dairy Cows.

The native Arran cow, portraits of which adorn the pages of books published in the early years of the nineteenth century, and from its appearance closely akin to the Kerry, is extinct. There can be little doubt that the presence of black and white colours in Ayrshire cattle is due to the strains of blood from this source which commingled with the Teeswater strains to build up the modern Scottish dairy breed. The Arran cow was not restricted in its habitat to its island home. It was to be found in Cunninghame or North Ayrshire, and the sprightliness of the modern Ayrshire is in large measure derived from this source. Consequently the conquest of Arran by the Ayrshire is not wholly the result of an invasion, it is in large measure a development, the blood of the conqueror mingling with the blood of the native breed, and producing a most useful commercial type of dairy cow, adapted in weight of body to the soil on which it is reared.

Sheep Farming.

The other leading breed on the island is Blackface sheep. Arran sheep are notoriously sound, good doers, and are in keen demand by lowland graziers.* Not infrequently Arran wether

lambs have topped the Lanark and Ayr autumn markets, and the type of sheep reared in Arran is popular with lowland feeders. The wool is dense and of a genuine character, free from hair, and in favour with wool-brokers and merchants. The mutton reared on Arran hills is "gamey" in flavour, and no more toothsome morsel can be desired than a chop from an Arran wether. There is strong rivalry at the district show, which is held at different centres in the island annually, and the principal flockmasters are keenly alive to the importance of maintaining the high reputation of their flocks. Generally speaking the Arran Blackfaces are not of the largest size. They are well-framed and active, and among the farmers are many good judges of the breed.

Small Landholders.

Arable farming is not followed so keenly as it used to be, and there is an increasing indisposition among tenants to break up much of the land. Some parts of the island are admirably adapted for raising early potatoes, and while not quite so early as those produced on the Ayrshire coast, the potatoes from Arran come into the market earlier than from other parts of the western seaboard. Much of the land is still held on the communal system. The occupants of the various townships were really crofters, although the Crofters Acts did not apply to Arran. The provisions of the Scottish Small Landholders Act of 1911 are, however, applicable, and the principles prevailing in the Crofting Counties, as scheduled in the original Acts, are now applicable to Arran. What effect this may have on the future of the island is matter of speculation. Except in respect of damage by game, the Arran tenantry, large or small, had little to complain of, and the estate authorities latterly did their best to restrict the deer to the north end of the island, erecting miles of costly deer-fencing, and mitigating in large measure any difficulties under this head.

The liberty to let their houses to summer visitors was a boon enjoyed by the smaller tenants in Arran, which would not have been theirs had the Crofting legislation applied, and the later estate policy in respect of tenure of holdings enabled them to erect better houses than they would have cared to invest in under the old system of tenancy at will. Arran, in fact, is one of the districts in which the effects of the new legislation will be fairly tested, a considerably large percentage of the tenants coming within the limits laid down in the new legislation, alike in respect of the extent of their holdings and the rents levied on them.

Land Cultivation.

It may be said in general that the agriculture pursued on these smaller holdings in Arran hitherto has neither been better nor worse than that pursued on similar holdings elsewhere. As a rule the smaller tenants were made welcome to the loan of the improved implements in use on the larger farms. This, under any circumstances, is a great boon, and makes for efficient agriculture. Arran, during the past twenty years, received its own share of attention from itinerant instructors in dairying and extension lecturers from the Agricultural Colleges, and the smaller tenants were quite as willing to avail themselves of their assistance as the larger. There was therefore a gradual levelling up in methods, but very much still remains to be accomplished before there can be much self-congratulation on the part of either large or small tenants in the island.

Co-Operative Movement.

The co-operative movement has secured a footing among farmers, but it is still confined to the more enterprising tenantry in the Shiskine and Southend districts. The task before the officials under the new legislation is to demonstrate that small holdings, such as prevail in many parts of Arran, can be made economically successful independent of the revenue derived from the letting of houses to summer visitors. Possibly in no part of the country is there greater scope for an advance which will yield substantial profit to the makers of dairy produce and the keepers of poultry, without materially modifying the conditions of tenure.

1881 and 1911.

Casting one's eye over the island and comparing the agricultural conditions on the smaller farms in 1911 with those which prevailed when we last reviewed the Agriculture of Arran (see 'Transactions,' Fourth Series, vol. xiii., 1881), the improved conditions of the steadings and dwelling-houses is perhaps the most outstanding feature. The process of rebuilding has not been confined to the farms, but whole villages have been rebuilt and great improvements effected in sanitary arrangements. Thatched houses have to a large extent disappeared. The settlement in the south end of the island called Laven Corrah is an outstanding illustration, but it is by no means isolated. But changes during the thirty years are much more marked in the housing than in the cultivation of the soil. Put into other terms, this means that the financial position of

the occupants has been ameliorated, but not the agriculture of the small holdings in a like ratio. The improvement has been due to social rather than to agricultural influences, and the summer visitor has been the main source of revenue. Thirty years ago there was only one pier on the whole island, viz., at Brodick, accessible at all states of the tide; now there are no less than four, and perhaps nothing has done more than this to increase the rental of the island and the revenues of the inhabitants. From being a comparatively small hamlet Whiting Bay has become one of the most popular watering-places on the Clyde, and, during August especially, sleeping accommodation is at a premium there and almost everywhere on the island. For the farmers large and small this means an unlimited demand for the products of the dairy and the poultry-yard.

These general observations will serve to convey some idea of the methods followed on the smaller farms, and to suggest lines along which, under the altered conditions now prevailing, the agriculture of Arran should be developed so as to retain upon the soil all who are already settled there.

BALNACOOLE.

Prominent among the larger farms is Balnacoole, in the Shiskine district, tenanted by Mr James Allan, a well-known breeder and judge of Blackface sheep. The farm extends to 350 imperial acres, of which about 250 are arable and 100 pasture, while there are about 2000 acres rough pasture or moorland. The soil is chiefly a soft-bottomed loam, reclaimed from peat moss. The method of reclamation is described in our earlier article already referred to. Little fresh draining has been done since the work of reclamation was engaged in from forty to fifty years ago; but there has been constant lifting and relaying of tiles, the character of the soil necessitating unremitting attention to drainage. The drains are laid about 15 feet apart, at a depth of from 3 to 4 feet, and are composed of stones, tiles, and turf. The cost of drainage is from 2s. to 4s. per imperial chain of 22 yards, which works out at about 120s. to 140s. per acre, the tiles being usually supplied by the landlord. A main leader drain was put in about eight years ago by the landlord, and while land generally in Arran as elsewhere could stand a lot of redraining, the remark does not specially apply to Balnacoole. Buildings and fences here, as generally throughout the island on the larger farms, are in good order, and there is a ready disposition on the part of the proprietor to meet tenants in respect of reasonable equipment of the holdings.

System of Cropping.

The rotation followed by Mr Allan is what is known as the six-shift, the order usually followed being—1st, oats out of lea; 2nd, green crop; 3rd, oats; 4th, hay; then in the fifth and sixth years grass. This is a very common rotation in the West of Scotland. It is found to suit the climate, and results in keeping a well-managed farm clean.

In sowing, Sandy Oats are applied to the extent of 5 to 6 bushels per acre, and about one-ninth part of the arable area is usually under oats. No wheat or barley is grown in Arran. Turnips are sown, perhaps to the extent of 3 to 4 lb. of seed to the acre. Change of seed is obtained from East Lothian.

The management of the land is that usually followed on the freer soils of the West of Scotland. The stubble is ploughed in late autumn, cross-ploughed or "grubbed" with the cultivator in early spring, and again, if required, before potatoes are planted or turnips are sown. Lea land is ploughed in February if the weather be suitable, and oat-sowing on lea begins as early in April as possible. The seed gets two "tines" of harrowing after being sown, and is then rolled. Green-crop land is worked in the usual way, and oats are sown out with grass seed on the red land as rapidly as it is cleared of the root crop in spring.

Farmyard manure is applied to the stubble in autumn. This course is regarded as a great saving of labour, and there is no evidence that it does not yield equally good results in the matter of cropping. Besides as much farmyard manure as can be made on the farm, the green crop gets a dressing of from 6 cwt. to 8 cwt. dissolved bones, bone-meal, and superphosphate, and oats if they require it get from 2 cwt. to 3 cwt. dissolved bones per acre. Slag is sometimes applied to the moss land at the rate of 10 cwt. per acre, and nothing yields better results on moss or cold clay soil. Potassic manures are also used, Mr Allan's experience being that the sole of grass after such dressings is of finer quality and contains more clover plants. Stock therefore thrive better on it, and the potash manures pay. Temporary pastures are sometimes laid down with rape and grass seeds, but the pasture afterwards is often not so succulent as after green crop. Sometimes Mr Allan has cultivated as much as one-half of his lea-break without a root crop, but this course is not resorted to because it is regarded as good practice, but because the turnip crop is often affected with canker. It is, of course, a saving of labour.

Timothy meadows are not a conspicuous success on such land as is found in Balnacoole. They do not last more than three years.

Green-Cropping.

Potatoes are only planted to the extent of two or three acres, for the use of the house and workers, and part local consumption. The varieties are Up-to-Date and Maincrop, with a few Sutton's Earlies. Cut-seed is planted in a 26-in. drill, and the land is harrowed, grubbed, and cleaned in the usual way. Purple-top Swedes and Aberdeen Yellow turnips are sown, and the crops vary from 15 to 27 tons per acre. In storing turnips the practice generally followed in the West of Scotland, where frosts are not keen, is pursued. A portion of the crop is "pitted" in the fields, covered with straw, and the remainder are carted to the steading as required. Rape is found very useful as a catch-crop where sheep are fed; but on damp-bottomed land, like that on Balnacoole, it is not a success in a wet season.

Live Stock.

The cattle carried are mostly Ayrshires—about 60 head being the normal quantity. A number of Aberdeen-Angus crosses are reared from these—a pedigreed bull of that breed being kept. Calves are reared, mostly on the pail. The Ayrshires are always so reared; sometimes the crosses are suckled by their dams.

Blackface Sheep are a speciality, and tup-rearing on approved principles is followed on a small scale. About a score of tups are usually brought up annually. When weaned they are put out on clean grass, and a few of the best-matured of them may be used in the first season. They are wintered out, and sold in autumn as shearlings. Arran is not in the usual acceptation of the term a tup-rearing district. Several of the leading breeders follow the sensible plan of purchasing an aged tup of approved reputation after he has made his mark as a sire. This gives an excellent change of blood, and has done much to grade up Arran flocks. Mr Allan keeps his own draft-ewes, crosses them with a Border Leicester tup, and sells off the lambs, fat, during the summer, feeding the ewes off on rape or clover.

Labour.

The labour problem is acute in Arran. The reasons for this would perhaps be difficult to explain. The staff on Balnacoole consists of three ploughmen, two shepherds, and two orramen or lads. Women workers are exceptionally scarce. Boys get about 9s. per week, orramen 20s. per week, ploughmen about that figure with free house and perquisites. Shepherds are engaged by the year and paid half-yearly. The labour bill on

a farm like Balnacooles runs to about £350 per annum, and the supply is not over plentiful.

MACHRIE.

The neighbouring farm to Balnacooles to the north-east is Machrie, tenanted by Mr James J. Morton. The system of farming here described is, however, that of his father and predecessor in the holding, the late Mr John Morton. Machrie extends to about 250 acres arable, with about 1500 acres rough pasture or moorland. The soil is light, with a gravelly bottom, and easily wrought. In the main outlines the remarks applicable to Balnacooles are applicable to Machrie, but the soil on the two farms is not the same. The drains on Machrie are about 3 feet deep, and the cost of drainage is about 3s. per imperial chain. Fences are made of wire on larch stobs; there are a few thorn hedges, and some stone walls. Improvements, unless effected at the beginning of a lease, are executed by the landlord, the tenant paying 5 per cent interest on the outlay. The features of farming on Machrie are Blackface sheep-breeding, and the grazing of back-calving cows.

Cropping.

The six-shift rotation is followed. No land is ploughed out of stubble. The cultivator is first put through the stubble in the end of harvest, and the soil lies exposed to the weather during winter. The aim is to have the weed-roots killed by the frost. For green crop this land is ploughed about the end of January, and it is again ploughed before being drilled and planted with potatoes. Red land is ploughed for oats in the end of April. Mr Morton did not approve of the autumn application of farmyard manure. For the turnip crop the artificials applied are 5 cwt. dissolved bones, 5 cwt. ground lime (1 cwt. potash with 5 cwt. basic slag, if no lime is used). Superphosphate is not applied to the root-crop, as Mr Morton believed it fostered finger-and-toe. Basic slag has been applied with great advantage to rough land, where it has brought up a fine flow of clover. Potash manures have been found helpful when applied to roots, but detrimental when applied to potatoes. They increase the yield but destroy the quality. He does not approve the system of cultivating land without a root-crop, frankly pronouncing such a system "very bad." Sandy Oats are in favour, and sown about 22 acres lea and 10 to 15 acres red land.

Roots sown are Eclipse and Austin & M'Aslan's Kangaroo. The stubble intended for the root-crop gets about six "tines"

of the Massey-Harris Cultivator in autumn; it is then ploughed extra deep in the end of January; after a time it is harrowed, and the dung is applied in the beginning of April, it is ploughed in, and turnip-sowing begins about the 8th May. The yield per acre runs from 25 to 30 tons. The roots are not lifted and pitted: they are allowed to grow all winter, and carted in as required.

Manuring.

Mr Morton supplements these details, which exhibit some diversity in practice, with the following useful hints. He is greatly in favour of dunging land which has grown a potato crop and is to be laid out in grass. He has noted that there is a great difference between the part manured before the New Year, or immediately after, and that dunged immediately before the land is ploughed. The red land ploughed latest generally gives the heaviest grain crop in Arran, and on Machrie oats on red land are sown in the first week of May.

Labour.

The working staff on this farm consists of two ploughmen. The first gets 18s. per week with free house and perquisites; the second has £30 per annum, with board in the house. One byreman gets £20 a-year and board; and one shepherd has £28 a-year, a cow's keep, and other perquisites, working out at about £45 per annum. There are two female servants: the first gets £26, and the second £17 per annum, with board in the house.

GLENKILN.

This is a different type of farm. It is situated near Lam-lash, and when our inquiries were made was tenanted by Messrs Wallace & Hunter. There has since been a change of tenancy. The arable land extends to about 300 acres—and it carries on the rough pasture or moorland about 50 score Blackface ewes. The soil is mostly light and gravelly—what is called “free,” and adapted for potato-growing, of which a speciality was made. Generally the soil is well drained, with drains laid 15 feet apart and about 2 feet 6 inches in depth. The cost of opening and filling was 2s. 9d. per 22 yards. Land in many places could profitably be re-drained, not only in Arran but throughout Scotland, and it is one misfortune arising from uncertainties as to mutual obligations under changing legislation that much work of this kind is at a standstill. Various improvements were made on the equipment of Glenkiln during the tenancy of Messrs Wallace & Hunter, including additional housing—the

tenant doing the carting — and the erection of a hay-shed, piggery, dung-stead, calf-house, cart-shed, and hen-house. The leading feature of the farming operations was dairying, and on account of its proximity to Lamlash, Glenkiln is well adapted to this purpose.

Cropping.

The farm was wrought on the usual six-shift rotation already described. Besides the customary crops, cabbages were grown, being planted to the number of 10,000 per acre. Oats were sown in the ratio of 6 bushels per acre, and turnips 5 lb. per acre. Ploughing stubble begins in the end of autumn, and this part of the break is again being put in order for early potato-planting by the end of February. Farmyard manure was applied in autumn on level and low-lying land, but not on steep land. Artificials adapted to the object in view and sold as potato-manure were used for early potato growing: phosphates and basic slag yielded good results with turnips, and for oats 3 cwt. phosphates and 1 cwt. ammonia per acre were applied. Potash manures were not much used, but large quantities of sea-ware were applied to the potato-break. Basic slag in the proportion of 10 cwt. per acre yielded good results on rough pasture. A wider variety of oats was used here than on the farms described in the Shiskine district. Hamilton and Early Fellow, as well as the Sandy variety, were in favour. Altogether about 30 acres were under oats annually, straw being an important consideration where there is a heavy head of dairy cattle. Again timothy was successfully grown here — although meadows do not last long in other parts of the island. Messrs Wallace & Hunter had about 20 acres under this hay crop every year, and a meadow lasted from five to seven years. A heavy dressing of farmyard manure was given every second year, and a dressing with artificials in the alternate year. Barley was sown as a catch-crop after early potatoes, and was either eaten off by sheep or cut and fed to the dairy cows. Used either way it proved a profitable addition to the food-supply of the farm.

Catering for the early potato market is not a general feature of Arran agriculture, but Glenkiln and Clauchlands, at the west and east ends of Lamlash, being easily accessible and convenient for marketing, have long made a feature of this crop. The early varieties planted at Glenkiln were Epicures and Puritans, and $7\frac{1}{2}$ tons per acre were regarded as a fair crop. The drills were drawn 26 inches wide, and whole "setts" were planted about 9 inches apart. The seed was boxed after the Jersey fashion, adopted many years ago by the farmers on the Girvan coast; and by this means early sprouting of the plant is secured.

The "setts" were boxed direct off the field, dried in an open shed, put into a close dark shed for the winter, light being admitted at intervals as the condition of the setts was found to require to warrant it. There is a deal of work with the potato crop, whether late or early. The drills are harrowed down immediately after planting with the saddle harrows. After the plants appear, the grubber goes between the drills, followed by the hoes, and the drills are again "set up." Once more they are drill-harrowed and touched up with the hoe, and finally "set up" by the plough. Generally, Arran Earlies can be lifted about the end of June or beginning of July. They are not quite so early as the Girvan crops, but are on the Glasgow market before what is technically called the "early" season is over. Good prices are obtained for the early varieties, and some years the figures are speculatively high. The later varieties grown on Glenkiln yield about 10 to 12 tons per acre, and are not quite such a speculative crop as the Earlies.

Swedes (Best of All variety) and Aberdeen Yellow turnips are the other green crop—yielding from 26 to 28 tons per acre. These would not be lifted at all until required were it not for trouble with the deer, which, especially in a hard winter, were given to helping themselves. Cabbages are grown in the usual way, and are a most useful crop where dairying is carried on.

Live Stock:

Ayrshires were the leading stock on Glenkiln in Messrs Wallace & Hunter's time. They carried a stock of from 70 to 80 head of all ages—40 as a rule being milk cows. Calf-rearing was extensively followed, the youngsters getting sweet (whole) milk for the first six weeks of their life, thereafter skimmed milk mixed with bruised linseed-cake and oatmeal. Milk was sold retail in the locality, and butter made. From 1s. 2d. to 1s. 4d. per lb. was obtained for fresh butter during the season when the houses were filled with visitors from Glasgow and the Ayrshire towns. Surplus milk at other seasons was sent to Glasgow.

Labour expenses on a dairy farm which is also an early potato farm are necessarily heavy. Many hands have to be employed at seasons, and it is not easy working out the figures per acre. Two ploughmen were constantly employed; two shepherds, with an additional hand at lambing-time; three orramen were in regular employment, and many more during pressure of seasonal work as indicated; also three women workers and two boys. This style of farm calls for considerable skill in organising, unremitting toil on the part of master, mistress, and

servants, and vigilant observation of the climatic changes proverbial in Arran.

KINTYRE FARMING.

The peninsula of Kintyre agriculturally bears some resemblance to Arran, from which it is separated by the Sound of Kilbrannan. From Skipness to the Mull of Cantyre the character of the soil is varied. There are stretches of mountain heath grazed by Blackface sheep; great plateaus of fine level land like the district known as the Laggan, between Campbeltown and Machrihanish; comparatively bare, thin land, such as one passes on the road from Campbeltown to the Southend; then stretches of good, light potato soil along the shores of the Sound, culminating in the rugged grandeur of the sheep-grazings at the Mull itself. Mountain grazings in the Kintyre peninsula have only a moderate reputation for soundness. Here, if anywhere in Scotland, acclimatisation is a sure asset, and so serious has the difficulty of taking over such farms become in the past twenty years that many of the sheep-farms are in the proprietors' hands. The Duke of Argyll is perhaps the most extensive proprietor in the district. From his house, Campbell-town, the capital, takes its name, and his Grace holds more land in his own hands in Kintyre than most lairds care to be responsible for. There is little help for this in these days, as sheep-stock valuations on land like that of Kintyre have pretty well extinguished the surplus of profit to which the name "rent" might be applied.

Like his brother lairds in the Glenbarr and Kilcalmonell districts of the peninsula, the Duke has made strenuous efforts in the past twenty years to improve the stock on the Kintyre ranges. At the autumn ram sales his representative and the representatives of other Kintyre lairds have been extensive purchasers of tups, and the ram sales held at Tarbert and Lochgilphead have been the means of distributing the produce so bred throughout Argyllshire. As a rule, Kintyre flockmasters, while not indicating any special flock prejudices, have been patrons of the Overshiels type of sheep. They have found by experience that tups from the Lammermoor ranges have done best on the Kintyre ranges, and while not refusing to invest in Glenbuck or Cadzow rams, or rams of the types identified with these names, they have found the Overshiels tups in comparison to yield the best results. Many scores of Blackface rams of this type were from first to last purchased by the late Mr David M'Gibbon, who was for many years the Chamberlain of Argyll in Campbeltown, and the policy which he inaugurated has been steadfastly adhered to by those who

have been called upon to carry on the management of sheep farms in Kintyre.

KILMAHO.

Great estate improvements have been made in Kintyre during the past twenty-five or thirty years. Many of the steadings on the Argyll properties were renewed during the period when Mr M'Gibbon reigned as Chamberlain, but perhaps the most striking and wholesale improvements are to be seen on the estate of Kilmaho, owned by Mr Alexander Fleming, one of the partners of William Baird & Co., iron-masters. The lands on this estate have been redrained, stone fences erected, and steadings renewed. The roadways have been put into first-class repair, and everywhere there is evidence of the expenditure of landowner's capital in increasing and improving the equipment of the farms. The land also seems to be better farmed—and none of the farms were derelict during the period when some of the best farms in Kintyre were going a-begging for tenants. The evidence of unremitting attention to detail in equipment abounds on the Kilmaho estate.

MACHRIEBEG.

This is not a sheep farm, but one of the most representative of the low country farms in Kintyre. It is situated at the south end, almost opposite the island of Sanda, is the property of the Duke of Argyll, and has been tenanted for a period of half a century, or perhaps more, by the veteran Mr William Hunter, now in his 96th year, and his son, Mr James A. Hunter, who succeeded him in the lease about twenty years ago. Machriebeg extends to about 200 acres arable, with about 50 acres rough pasture or moorland, and is one of the best-known potato farms in Kintyre. Mr James A. Hunter also holds several extensive sheep farms, and is one of the most progressive of the Kintyre farmers. The land near the sea, where early potatoes are grown, is very light; in the centre of the farm there are about 100 acres very good land; but back towards the hills the soil is poor, cold, and thin.

CROPPING.

The leading features of agriculture on Machriebeg are dairying and potato-growing. The rotation is a five-shift—viz., oats, green crop, barley or oats, and hay, with one year in grass. The land near the sea is almost constantly under early potatoes, for which it is well adapted. Oats sown are usually of the Tam Finlay variety, which is equivalent to saying that

straw is of greater importance than grain. The quantity sown is generally about 5 bushels to the acre. On account of proximity to the distilleries, for which Campbeltown is famous, barley is a leading crop in the peninsula. It is sown to the extent of 4 bushels to the acre on the red land, and sown out with a hay crop to follow. Oat seed is obtained from Ayrshire, and barley seed from the east of Scotland.

Stubble ploughing begins immediately after harvest. The cultivator is not much used, Kintyre farmers believing rather in crossing ploughing for spring work, and harrowing down, then drilling up. Land sown with grain is always rolled, and where grass-seeds have been sown with the barley or oats the land is rolled twice. Farmyard manure and sea-ware are applied in considerable quantities—as much as twenty to thirty tons per acre being put on some seasons. On account of the formation of the peninsula, sea-ware is abundant, and full advantage of this abundance is taken by the farmers.

Land intended for turnips is not manured until spring, but on land intended for potatoes dung is applied in autumn on the stubble and ploughed in. Besides these dressings with farmyard dung and sea-ware, Mr Hunter gives his potato crop about 12 cwt. per acre of what is called 10 per cent potato manure, and his turnip crop gets about 6 cwt. superphosphates, with about 1 cwt. ammonia added. On the higher ground, to which it is more difficult to apply dung, about 12 cwt. pure dissolved bones are applied. Basic slag has not been a success on this land, and potash manures are not applied, as abundant supplies of that form of plant-food are obtained from the seaweed. A timothy meadow has been laid down with fair success. It extends to about 8 acres, and is kept in heart by dressings of dung and sea-ware every second year, and about 1 cwt. of nitrate of soda in spring.

Early potatoes are the sheet-anchor of the farming economy. About one-eighth of the whole arable land is annually under this crop. The “very early” market is aimed at—and as a rule attained. The varieties planted are Epicures, Ninety-folds, Puritans, and Nonsuch. The drills are 24 inches apart, and the sets are planted about 12 inches apart, medium-sized whole sets being preferred. Boxing, after the Jersey model, is of course practised. The sets are boxed when dug in July, turned over in the boxes after harvest, and allowed to grow until planting time. The crop is usually ready for lifting sometime between the 8th June and 1st July, and is sold by the acre to the merchant, who lifts the crop, the farmer doing the carting to the steamer.

Swedes and turnips sown are mostly Austin’s Eclipse, Best of All Swedes, and Imrie’s Improved Aberdeen Yellows. The land

is cross-ploughed in spring, cultivated, harrowed, and rolled, until the tilth is fine enough, when it is drilled, the manure covered in, and the seed sown to the extent of about 4 lb. per acre. The yield of roots will be about 25 tons per acre on the good land—and less on the poorer land. As there is little frost so close to the sea, roots are only lifted as required and to clear the ground for the succeeding crop.

Live Stock.

Mr Hunter specialises in Ayrshire cattle (about 40 head), Blackface sheep, and Clydesdale horses. He uses a Polled Angus bull, and breeds calves, nearly all of which are kept and reared. They get milk for about six weeks. Afterwards calf meal and a little cake all summer when on the grass. They are wintered out on turnips, cake, and hay, and sold as stirks in the store market. The produce of the dairy is made into Cheddar cheese, and as a rule sold to the merchants at the farm. There is a dairy produce show in Campbeltown in the autumn, and Kintyre cheese is in quite good repute among the Glasgow merchants.

Blackface tups reared on Mr Hunter's hill-farms are wintered and fed at Machriebeag. They are taken from the hill at weaning time, put upon good foggage till about the New Year, when they are housed; clipped about 1st March, put out during the day from about 1st April, put out day and night from about the beginning of May, and get little but grass during the summer. They are sold at the autumn ram sales at Tarbert, Lochgilphead, and Greenock. The Machriebeag tups have a good reputation among Argyllshire flockmasters, and the quality of the flock is sustained by the frequent purchase of a ram from one of the principal flocks in the Lanarkshire or Lammermoor ranges.

Clydesdale horses have long been successfully bred on Machriebeag. Kintyre as a whole is a great Clydesdale breeding area—many foals being reared every year. Mr Hunter usually has three or four, which are run with their dams until about the middle of October, when they are weaned and wintered on oats and straw with a few turnips.

Labour.

The usual staff employed on Machriebeag consists of 3 ploughmen, 1 boy, 2 orramen, and 2 women-workers. Ploughmen are paid weekly about 20s. per week, including perquisites; single men get from £12 to £14 per half-year with board, and women from £10 to £12 per half-year with board. Mr Hunter

estimates the cost of working such a farm as Machriebeg to be something like this: oats and barley about 30s. per acre, turnips and potatoes, 50s. per acre,—exclusive of harvesting expenses.

Implements.

The inventory of these includes two reapers, three iron ploughs, two Oliver chilled ploughs, one Dux plough, three drill ploughs, three pairs of harrows, one roller, one cultivator, one three-horse grubber, three drill grubbers, or harrows, manure sower, broadcast seed sower, turnip sower, hay rake, hay tedder, potato-digger, and thrashing-mill with power.

ULVA, MULL.

Although it be a far cry from the Sound of Kilbrannan to the Sound of Mull, yet the great county of Argyll includes both, and in these days, when Highland lairdships go a-begging, this article may conclude with a few particulars regarding the management of an island estate in Mull.

Ulva, a small island on the west coast of Mull, covering an area of 5000 acres, is in the possession and occupancy of Mr Francis W. Clark of Ulva, Aros. Of the 5000 acres, 57 only are arable, 21 may be characterised as pasture, and about 4800 are rough pasture or moorland. The soil is a light gravelly loam, mostly very shallow. The arable land had been drained with stone drains, which are gradually being replaced by tile drains, a little work of this kind being overtaken annually.

The leading features of the rural economy on a farm of this kind are the breeding and rearing of Cheviot and Blackface sheep and Highland cattle. So far as cropping is concerned, the usual four-course rotation is followed of oats, green crop, oats and seeds, and then hay for two to four years. Stubble ploughing does not begin until November, and the manures chiefly used are farmyard dung and sea-ware. Artificial manures are limited in quantity, being restricted to superphosphates and compound turnip manures. Sandy oats and sometimes Hamilton oats are sown to the extent of six bushels per acre. Potatoes are only grown to the extent required to meet local necessities and the perquisites to servants. Although various sorts have been planted, farm servants are partial to the unfailing "Champion," and so it retains premier position. The root crop usually consists of Purple Top swede and Foster-ton hybrid. The crop is eaten off by hogs; what is not thus disposed of is lifted and stored for use by the cattle at the steading.

Live Stock.

On land such as Ulva the rearing of stock is the only possible line in which there is prospect of return. Mr Clark keeps 22 pedigree Highland cows, each of which should rear a calf every year. The calves suckle their dams and get all the milk. They are out on the hill together until weaned, then are housed during the succeeding winter and fed on turnips and cake. The strongest stot calves are sold in May at the Oban sales, the others are sold in October, or in the May following as two-year-olds. The quey calves are kept until May and sold then as two-year-olds.

The diary of a Highland shepherd's year in the management of a Mull Cheviot or Blackface flock, as given by Mr Clark, is interesting:—

March	Dip all sheep.
April (end of)	Lambing begins.
June (1st week)	"Marking" lambs.
" (3rd week)	Clipping begins.
August (3rd week)	Dip all sheep and separate the lambs.
September	Autumn sales.
October (end of)	Dip all sheep and separate cast ewes.
November (2nd week)	Hoggs brought in from the hill for wintering.
" (last week)	Let out tups.

Labour.

The staff on Ulva consists of one ploughman and one under-ploughman, three shepherds, and two or three labourers during harvest. No women-workers can be got. All the servants except the second ploughman are married, and have houses, coals, keep of two cows and followers, and potato ground. Wages vary, but in cash they may be about £25 a-year.

TOP-DRESSING PASTURES.

PHOSPHATE, POTASH, AND LIME.

By R. SHIRRA GIBB, Boon, Lauder.

AN experiment, conducted on over twenty different farms, was begun in 1898 to test the result of dressings of slag, ground lime, and kainit on poor pasture land. This experiment was reported on in vol. xviii. of the 'Transactions' (page 80), and showed, according to the opinion of the experimenters who

reported on it, very varying results. In some a wonderful improvement resulted from the application of slag, in others no beneficial effect could be traced even after some years.

The present experiment was started with the object of finding out the reasons why slag, as a phosphatic manure, should be so variable in its effect.

It was decided that it should be carried out in co-operation with the three Scottish Agricultural Colleges—and reported on by a representative of the Highland and Agricultural Society. The County Work Committees of the different Colleges were asked to select the plots on which the experiment should be conducted, the Highland and Agricultural Society to supply and pay for the manures.

The idea was that each College staff should select three soils as different as possible, in their own districts—probably a clay soil, a gravelly soil, and a black-topped or moory soil, and in parts differing in climate and probably other conditions.

The *West of Scotland Agricultural College* only selected one plot, and that on high hill pasture in the Strathaven district of Lanarkshire.

The *Edinburgh and East of Scotland College* selected three plots, which to a certain degree differ from each other, one being a good pasture on a gravelly loam in high condition on Deanfoot, Mr J. M'Hutchen Dobbie's Peeblesshire farm; another, also a gravelly loam, but lighter and more moory, on the southern slopes of the Pentlands, at Coates, near Penicuik—farmed by Mr Fleming; the third at Mr Crichton's farm at Aikendean, near Dalhousie, where other College experiments have been carried on.

In the *North*, three plots have also been selected, and are sufficiently far apart, one being at Shields, near Fordoun, in Kincardineshire; another at Dubston, near Alford, on Donside, in the centre of Aberdeenshire; and a third on the Highland Railway, near Kingussie.

The manures were supplied, after being tested, to the seven experimenters early in 1909, and were sown under the inspection of a member of the respective College staffs.

They were visited and reported on during the first summer by officials from the Colleges, and improvement on some of them was even noted then.

In 1910 the writer was asked to go round and visit all the plots with a view to reporting on the results. It was considered, however, that too premature a report might be misleading, so a further visit of inspection was made in July 1911—and the result as ascertained at these visits is now given.

From a meteorological point of view the two years 1910 and 1911 have been very different—the extreme drought of 1911 materially affected the appearance of the pastures.

In a general way it may be said the plots selected do not tend to elucidate the chief point of the experiment—namely, under what conditions is slag not beneficial. For as far as this experiment is concerned the point is still undetermined. On all the plots phosphatic manures have induced a distinct increase in white clover and in the general kindliness in the pastures.

The Lanarkshire plot, selected by the *West of Scotland Agricultural College*, is on high ground on one of the farms called Brackenridge, between Lesmahagow and Strathaven. This would seem in its natural state to be the poorest of all the seven selected areas, but one which from the very first responded to phosphatic dressings in a marked way.

The ground was divided into eight sections.

		Rate per Acre.	
Section A	received .	Basic slag	10 cwt.
" B	" .	Kainit	5 "
" C	" .	Ground lime	1 ton.
" D	" .	{ Slag	10 cwt.
		{ Kainit	5 "
" E	" .	{ Slag	10 "
		{ Ground lime	1 ton.
" F	" .	{ Kainit	5 cwt.
		{ Ground lime	1 ton.
" G	" .	Finely ground Algerian phosphate	10 cwt.
" H	" .	{ Algerian phosphate	10 "
		{ Kainit	5 "

On sections A to F inclusive the manures were applied on 25th December 1908, and the Algerian phosphate on sections G and H was sown in the beginning of February 1909. Originally on this plot sweet vernal and moor-bent were the prominent grasses, with some stunted clover plants, sections C and D probably showing most clover—generally the herbage was white and bleached and poor.

Even in the first season, 1909, a change was seen on sections A, D, E, which were greener and seemed better eaten. G and H also appeared greener in patches. Sections B and C were unaltered, and would appear as if they had gone back. This may have been only apparent owing to their comparing unfavourably with the others alongside that had improved.

When visited in the early summer of 1910, the improvement on the sections of this plot which had got phosphatic manures was most marked—A, D, E, G, H were most easily seen, and required no marks to indicate their boundaries. The lime on sections C and F seemed to be causing a little more growth, as they looked greener than the unmanured parts of the field. In July 1911 the changes of 1910 were found to be emphasised—and on the slag sections A and E especially were the clover plants thickening up so as to give the prospect of a really good

pasture. Section D, which had got the addition of 5 cwt. of kainit, was nearly as good as, and G and H, the two Algerian phosphate sections, were not a bit behind the best of the slag plots.

B, the section with kainit alone, was still very poor, and only a little better was the ground lime alone, on section C, while F, with both lime and kainit, was very little better than the adjoining untreated ground.

The effect of phosphatic manuring on this ground is most remarkable, and as there is a great deal of the same class of land in the district in which this farm is situated, it would seem that farmers occupying it might be interested in seeing the results, should they find time to give this plot a visit. Neither the lime nor the kainit alone or in combination seem to have paid the cost of their application. The best sections show an improvement equal to 60 per cent over the adjoining pasture.

For the Edinburgh and East of Scotland Agricultural College one of the three plots—the plot at *Coates*, is situated on the south-eastern slope of the Pentlands, 1000 feet above sea-level, and has been in grass for about forty-five years. It got a heavy dressing of lime in 1875 (about eight tons per acre). The soil is a moory, gravelly loam. The manures were applied on 5th February 1909. During the first summer a difference was visible on the sections which got slag and Algerian phosphate. The visit in the summer of 1910 showed marked results, and in 1911, notwithstanding the drought, they were equally well seen. From a long distance the various sections showed different shades of green on the hillside.

Slag here seems to have done better than Algerian phosphate. Slag alone, and slag and lime seem to give about equal results, and slag with kainit and Algerian phosphate with lime are not much behind, while kainit and lime, either alone or in combination, do not seem to have made an improvement commensurate with the cost of their application. The best sections easily show an improvement equal to 40 per cent over the adjoining pasture.

At *Deanfoot*, near West Linton, the improvement is not so marked. The pasture here probably to begin with was better. The growth and freshness of all the sections was quite good, and the only points that may be noted are that the slag and Algerian phosphate have made the stock eat barer on the sections to which they have been applied.

It would almost seem as if so far the kainit here had done positive harm, and the lime has certainly done no good. It is difficult to estimate by a figure the improvement on this pasture by the phosphatic manuring, but it is enough to be quite noticeable.

At *Aikendean*, where the soil is heavy and wet, slag might be

supposed to have been pre-eminently the most suitable manure. But the Algerian phosphate has all along looked rather the better—lime has had more effect here than on any other of the seven plots of the experiment, and on none of the plots is the detrimental effect of potash, or what the late Dr Aitken used to call potash depression, so evident.

Mr Crichton experimented in connection with the early trial begun in 1898, mentioned above, and at that time reported no result from the manuring. He will now probably agree that on the plot now being reported on, the slag and Algerian phosphate have produced a result equal to a 30 or 40 per cent improvement over the unmanured ground adjoining, and that the lime has also done an appreciable amount of good.

The plots selected by the *North of Scotland* College Staff do not differ very materially as to quality of soil, and do not seem to have produced the same interest on the part of experimenters or the neighbouring farmers as they have done in the East.

The plots at *Shields*, near Laurencekirk, do not call for much in the way of a report. They are high-lying, with a north-westerly exposure. Owing probably to the rough nature of the pasture and probably the method of grazing, not much result is noticeable.

The *slag alone* section seemed barer eaten, but was distinctly patchy. No difference was to be detected on the potash section, while the lime sections were markedly improved.

It seems probable that with heavier stocking and barer grazing many of the clover plants which are smothered by the rank herbage would have room and encouragement to spread and develop, and the beneficial results of the slag and lime dressings, which are certainly even now to be seen, would become more evident. No Algerian phosphate has been tried here.

Of the North Country plots quite the most interesting are those of *Major Forbes at Dubston*, near Alford. The soil is typical of quite a lot of ground in the higher parts of Aberdeen and Banff shires. There was plenty of clover, though some of it not very robust, in the pasture before the manures were applied, so that the encouragement given by the phosphatic manures is very evident. Slag alone, slag with ground lime, slag with potash, Algerian phosphate with and without potash,—are all practically the same, and two other sections on which superphosphate has been used are very little behind. Potash and ground lime both alone and together would seem also to have done good, and caused the herbage to be barer eaten by the stock. Whether their application has paid or not, Major Forbes may be able to say. At all events, it would appear that the phosphatic dressing has paid, and the improvement from it may be roughly estimated at about 30 per cent.

The plot at Mr M'Gillivray's, *Ballachroan*, near Kingussie,

has been somewhat spoilt experimentally by being laid on across the hillside rather than up and down—it was also only in 1910 that any result could be noted. In 1911 it was so burned up by the drought as to be an even brown colour all over, from which no result could be traced. Potash here in 1910 had not done much good if any. Algerian phosphate alone seemed better than slag alone, but that might be because the section so treated was better situated; lime does not seem required, as on all the other plots phosphates do best, and alone. But it is questionable if any such manures pay on soil as light and subject to drought, without some means of supplying humus as well.

The whole experiment shows that in all probability there are not many worn-out pastures that do not benefit by the application of phosphatic manures; that Algerian phosphate, if finely ground, is not much inferior to slag if applied in the same quantity. That potash in any form should be carefully experimented with first on small areas before much expense is incurred in applying it to old grass land. That ground lime at a ton per acre is not much good as a surface dressing, if judged by the results of only three years' inspection.

MILK RECORDS.

NINTH YEAR—RECORD OF 13,965 COWS.

By CHARLES DOUGLAS of Auchlochan, Lesmahagow.

THE Scottish Milk Record Committee has continued its work in 1911.

During this year it consisted of the following members:—

Name and Address.	Representative of
Mr Alex. Cross of Knockdon, 19 Hope Street, Glasgow	} Highland and Agricultural Society.
Mr Charles Douglas of Auchlochan, Lesmahagow	
Mr T. C. Lindsay, Aikenbrae, Monkton	} Ayrshire Cattle Herd Book Society.
Mr James Howie, Hillhouse, Kilmarnock	
Mr A. W. Montgomerie, Lessnessock, Ochil-tree	
Mr Matthew Hunter, Adamhill, Craigie, by Kilmarnock	
Mr James Dunlop, of Gree, Fenwick	
Mr Alex. M. Stevenson, Jeanfield, Symington, Ayrshire	

Name and Address.	Representative of
Mr W. T. R. Houldsworth, Kirkbride, Maybole	Carrick Milk Record Society.
Mr Thomas Howie, Fairfield Mains, Monkton	
Mr David Wardrop, Knockterra, Cumnock	Cumnock Milk Record Society.
Mr James Moffat, Gateside, Sanquhar	Nithsdale Milk Record Society.
Mr W. H. Ralston, Estate Office, Dunragit	Dunragit Milk Record Society.
Mr James Dunlop, Hallhouse, Fenwick	Fenwick Milk Record Society.
Mr Robert Wilson, Westwood, Dunlop	"John Speir" Milk Record Society.
Mr John McCaig, Belmont, Stranraer	Leswalt and Kirkcolm Milk Record Society.
Mr Gavin Hamilton, British Linen Bank, Lesmahagow	Lesmahagow Milk Record Society.
Mr Alex. Wyllie, Mossgiel, Mauchline	Mauchline Milk Record Society.
Major J. A. Houison-Crawford, Borland, Kilmarnock	Montgomerie Milk Record Society.
Mr William Christison, Barglass, Kirkinner	Lower Wigtownshire Milk Record Society.
Sir Hugh Shaw Stewart, Bart. of Ardgowan, Greenock	Bute and Lower Ward of Renfrewshire Socy.
Col. Wm. Mure of Caldwell, The Hall, Uplawmoor	Upper Ward of Renfrewshire Society.
Mr H. W. B. Crawford, Chapmanton, Castle-Douglas	Nos. 1, 2, 3, and 4 Stewartry Milk Record Societies.
Mr W. P. Gilmour, Balmangan, Kirkcudbright	
Mr James Wallace, Chapelhill, Kirkcudbright	
Mr John Taylor, Edingham, Dalbeattie	
Mr Thomas Clement, Netherton, Newton Mearns	Co-opted Members.
Mr John Drysdale, 5 St Andrew Square, Edinburgh	

Chairman—Sir Hugh Shaw Stewart, Bart.

Secretary and Treasurer—Mr John Howie, 58 Alloway Street, Ayr.

Definition and Classification of Yields.

The lactations recorded in this Report are those actually or practically terminating in 1911; and they have been classified

on substantially the same basis which was adopted in last year's Report.

Experience confirms the view that the best unit to employ in the comparison of milk-yields of various qualities is that which reckons them in terms of gallons estimated at 1 per cent of butter-fat; and the classification is the same in this as in last year's Report. Yields whose quantity and quality taken together show a total of 2500 gallons calculated at 1 per cent of fat, for cows, and 2000 gallons for heifers, are classed as good; while those which are below two-thirds of these amounts (1660 and 1330 gallons respectively) are classed as bad. Those figures correspond, in the case of fairly good milk at 3·5 per cent of butter-fat, to yields of over 714 gallons from cows and 570 gallons from heifers in the good class, and of under 474 gallons from cows and 380 gallons from heifers in the bad class. This classification is found in practice to apply a fair criterion to cows in the various districts under review. It must, however, be kept in mind that no comparison worth making can be applied to the cattle of different parts of the country on the basis of these or any other figures, since the varying conditions of climate and soil, and the periods at which cows calve in various districts, create differences which are such as to stultify any attempt at comparison.

As in last year, the statements of milk-yields in the Appendix to the Committee's Report are made in terms not of the hypothetical 1 per cent unit but of the actual quantity and quality of milk given by the cows. The period of every yield is definitely stated; so that the Appendix contains the fullest and clearest statement that can be made of the facts under review.

Administration.

During 1911 the Committee's work was administered, as in former years, through the local Milk Record Societies, and by means of grants of £200 from the Highland and Agricultural Society and of £40 from the Ayrshire Herd Book Society.

Five new societies have been formed during the year—the Mauchline, Montgomerie (in North Ayrshire), Nithsdale, Stewartry (No. 4), and Upper Ward of Renfrewshire.

The number of herds under test has risen from 217 in 1910 to 333 in 1911, while the total number of cows tested shows an increase from 9500 in 1910 to 13,965 in 1911.

The following is a list of the Milk Record Societies in 1911 :—

Name.	Secretary.
Bute and Lower Ward of Ren- frewshire . . .	} Mr James Blair, Bankfoot, Inverkip.
Carrick . . .	
	Mr John Stevenson, jun., Balig, Ballantrae.

Name.	Secretary.
Central Ayrshire .	Mr James Howie, Hillhouse, Kilmarnock.
Cumnock and District	Mr A. W. Montgomerie, Lessnessock, Ochiltree.
Dunragit and District	Mr W. H. Ralston, Estate Office, Dunragit.
Fenwick . . .	Mr John Smith, Wyllieland, Fenwick.
"John Speir" . .	Mr Robert Wilson, Westwood, Dunlop.
Leswalt and Kirkcolm	Mr John M'Caig, Belmont, Stranraer.
Lesmahagow . . .	Mr Gavin Hamilton, Lesmahagow.
Lower Wigtownshire	Mr William Christison, Barglass, Kirkinner.
Mauchline and District	Mr Wm. Wallace, Auchenbrain, Mauchline.
Montgomerie . . .	Mr Robert Wilson, Westwood, Dunlop.
Nithsdale . . .	Mr John Henderson, Lockerbie.
Stewartry, Nos. 1, 2, 3, and 4, }	Mr Patrick Gifford, Solicitor, Castle-Douglas.
Upper Ward of Renfrewshire . }	Mr J. Campbell Murray, 216 West George St., Glasgow.

The following table shows the membership of the societies, cows tested under them, frequency of testing, and duration of the testing period :—

Name of the Society.	No. of members.	Period over which testing extended in weeks.	No. of cows tested.	Interval between tests, in days.
Bute and Lower Ward of Renfrewshire . . }	18	51·5	508	21
Carrick	16	52	770	21
Central Ayrshire . . .	18	52	640	21
Cumnock and District .	18	50·5	520	21
Dunragit and District .	14	39·5	957	21
Fenwick	24	52	856	28
"John Speir"	27	52	957	28
Leswalt and Kirkcolm .	17	40	901	21
Lesmahagow	23	52	658	28
Lower Wigtownshire . .	17	38	889	22
Mauchline and District .	18	45	575	21
Montgomerie	26	42	874	28
Nithsdale	23	49	954	28
Stewartry, No. 1 . . .	15	47	752	26
Stewartry, No. 2 . . .	13	50	882	28
Stewartry, No. 3 . . .	14	49	754	23
Stewartry, No. 4 . . .	15	45	858	24
Upper Ward of Renfrewshire	17	51·5	660	21
	333		13,965	

SCOTTISH MILK RECORDS COMMITTEE.

SEASON 1911.

Bute and Lower Ward of Renfrewshire Milk Record Society.

This society has this year a large increase in its membership owing to the inclusion of a number of farms in the Lower Ward of Renfrewshire.

As a further result of this, there is also a large increase in the number of cows tested—viz., 508 as against 207 in 1910.

Testing began on 5th January and was continued till 31st December (a period of 51·5 weeks), at intervals of 21 days.

Of the 508 cows and heifers under test, 128 cows and 20 heifers are classed as good, and 11 cows and 2 heifers as bad.

Carrick Milk Record Society.

This society has a membership of 16 as against 18 last year, and tested 770 cows as against 819.

Testing began on 1st January and continued till 31st December, having been carried on for 52 weeks at intervals of 21 days.

In this district milk is chiefly produced for direct sale, and cows calve at various periods of the year. During the summer months some cheese is made.

Of the 770 cows and heifers tested, 145 cows and 47 heifers are classed as good, and 39 cows and 2 heifers as bad.

Central Ayrshire Milk Record Society.

The membership of this society is unaltered from last year; but the number of cows under test is slightly reduced—640 as against 696 in 1910.

Testing is carried on throughout the whole year at intervals of 21 days. Milk is produced chiefly for direct sale; and the cows calve at various periods of the year. On some of the farms, however, cheese is made during the summer months.

Of the 640 cows and heifers under test, 196 cows and 96 heifers are classed as good, and 27 cows and 1 heifer as bad.

Although there is a slight reduction in the number of cows tested, there is a large increase in the number of good cows and heifers since last year—292 as against 195 in 1910—while the numbers of bad cows and heifers are reduced from 50 to 28 in 1911.

Cumnock Milk Record Society.

This society has 18 members as against 20 in 1910, and the number of cows under test is 520 as against 659. This decrease, however, is due to a subdivision of the district, and the formation of a new society in the adjoining parishes.

Testing began on 12th January and was continued till 31st December (a period of 50·5 weeks), at intervals of 21 days.

Most of the cows calve during the spring months, and cheesemaking is general during summer.

Of the 520 cows and heifers under test, 130 cows and 50 heifers are classed as good, and 27 cows and 7 heifers as bad.

Dunragit Milk Record Society.

This society continues to maintain its position, but with a slight alteration in membership, and tests 957 cows as against 832 last year.

Testing began on 9th February and was continued till 6th November (a period of 39·5 weeks), at intervals of 21 days.

Cheesemaking is largely carried on in the district, and most of the cows calve in February and March.

Of the 957 cows under test, 83 cows and 43 heifers are classed as good, and 64 cows as bad.

Fenwick Milk Record Society.

This society has 24 members as against 25 in 1910, and the number of cows under test being 856 as against 951.

Testing began on 1st January and was continued till 31st December, having been carried on for a period of 52 weeks, at intervals of 28 days.

Of the 856 cows and heifers under test, 284 cows and 163 heifers are classed as good, and 28 cows and 1 heifer as bad.

"John Speir" Milk Record Society.

This society is in its second year; but as a new society has been formed in its district, the membership has undergone considerable alteration.

It is now confined principally to the northern district of Ayrshire. This alteration in membership must be borne in mind when comparing results with other societies, as a large number of the records from the recently included herds are incomplete.

Milk is chiefly produced for direct sale, and cows calve at all periods of the year.

There are 27 members, and testing was carried on throughout the whole year at intervals of 28 days.

Of the 957 cows and heifers under test, 180 cows and 57 heifers are classed as good, and 49 cows and 3 heifers as bad.

Leswalt and Kirkcolm Milk Record Society.

This society continues to maintain its position with an increase of one in its membership, while the number of cows tested is 901 as against 854 last year.

Testing was begun on 11th February and continued till 11th November (a period of 40 weeks), at intervals of 21 days.

The cows all calve in the early part of the year, and cheese-making is largely carried on.

Of the 901 cows and heifers under test, 119 cows and 17 heifers are classed as good, and 31 cows and 2 heifers as bad.

Lesmahagow Milk Record Society.

This society continues to make steady progress, and this year has a large increase in membership—23 as against 17 last year—while the number of cows tested has also increased from 475 to 658.

Testing was carried on throughout the year at intervals of 28 days, two of the herds being tested at intervals of 14 days.

Milk is chiefly produced for direct sale, and cows calve at various periods of the year.

Of the 658 cows under test, 182 cows and 58 heifers are classed as good, and 17 cows and 1 heifer as bad.

Some of the herds only began to test in the spring months; and very few of the records of these are completely available.

Lower Wigtownshire Milk Record Society.

This society retains its membership of 1910, and has 889 cows tested as against 881.

Tests were taken at intervals of 22 days for a period of 38 weeks, from 6th March till 25th November.

The district is principally a cheesemaking one; and most of the cows calve in the early part of the year.

Of the 889 cows and heifers under test, 108 cows and 35 heifers are classed as good, and 79 cows and 6 heifers as bad.

Mauchline Milk Record Society.

This new society has been formed with a membership (as the name indicates) chiefly in the Mauchline district of Ayrshire.

Testing began on 19th February and was carried on till 29th December (a period of 45 weeks), at intervals of 21 days.

This district is chiefly a cheesemaking one, and most of the cows calve in February and March.

Of the 575 cows and heifers under test, 168 cows and 71 heifers are classed as good, and 10 cows and 1 heifer as bad.

Montgomerie Milk Record Society.

This new society has been formed with a membership chiefly in the Irvine and Dundonald districts of Ayrshire. It was chiefly formed through a subdivision of the "John Speir" Society, and some of its members were included in the latter society in 1910.

The number of members was 26, and there were 844 cows under test. Testing began on 19th March and was continued until 31st December (a period of 42 weeks), at intervals of 28 days. This, however, only applies to the new members, as those herds which were owned by members of the "John Speir" Society in 1910 were tested for a period of 52 weeks.

The conditions are practically the same as in the "John Speir" Society. The cows calve at various periods of the year, and milk is produced chiefly for direct sale.

Of the 874 cows and heifers under test, 254 cows and 97 heifers are classed as good, and 9 cows and 4 heifers as bad.

Nithsdale Milk Record Society.

This society which was last in operation in 1909 has been revived, but with a considerable change of membership.

There are 23 members, and the number of cows under test is 954.

Most of the cows calve in the early part of the year ; and some cheese is made during summer.

Testing began on 22nd January, and was continued until the end of the year (a period of 49 weeks), at intervals of 28 days.

Of the 954 cows and heifers under test, 193 cows and 70 heifers are classed as good, and 28 cows as bad.

Stewartry Milk Record Societies

Milk recording in the Stewartry continues to make steady progress. During 1910 operations were carried on under three different sections; but in 1911 another section was formed, making in all four separate schemes. The result is that the membership has gone up from 42 to 57, while the number of cows under test has also increased from 2369 to 3246.

Most of the cows calve during the months of February and March; and cheesemaking is largely carried on.

In Scheme No. 1 Society there are 15 members, with 752 cows under test. Testing began on 7th February and continued until 29th December (a period of 47 weeks), at intervals of 22-26 days.

Of the 752 cows and heifers under test, 90 cows and 46 heifers are classed as good, and 35 cows and 2 heifers as bad.

In Scheme No. 2 Society there are 13 members, and 882 cows under test, the herds in this section being exceptionally large.

Tests were taken at an interval of 28 days, for a period of 50 weeks, from 17th January until 31st December.

Of the 882 cows and heifers under test, 232 cows and 100 heifers are classed as good, and 17 cows as bad.

In Scheme No. 3 Society there are 14 members, and 754 cows under test. Testing began on 14th January and was continued until 23rd December (a period of 49 weeks), at intervals of 23 days.

Of the 754 cows and heifers under test, 194 cows and 73 heifers are classed as good, and 19 cows as bad.

In Scheme No. 4 Society there are 15 members, and 858 cows under test. Testing began on 11th February and continued till 21st December (a period of 45 weeks), at intervals of 24 days.

Of the 858 cows and heifers under test, 102 cows and 64 heifers are classed as good, and 18 cows and 3 heifers as bad.

Upper Ward of Renfrewshire Milk Record Society.

This new society has been formed with a membership chiefly in Renfrewshire. Although it is only in its first year, some of its members were originally members of other societies, and have been transferred to develop a new district more convenient for testing purposes.

Milk is almost entirely produced for direct sale; and cows calve at various seasons throughout the year.

Testing was carried on at intervals of 21 days, for a period of 51·5 weeks, from 5th January to 30th December.

Of the 660 cows and heifers under test, 133 cows and 66 heifers are classed as good, and 25 cows as bad.

The increase above recorded in the number of societies, in their total membership, and, in the number of cows tested, as

compared with the corresponding figures in 1910, represents an extension of nearly 50 per cent in the work of the committee during a single year; and this is a sure indication that the movement inaugurated by the Highland and Agricultural Society in 1903 has been found to be of real practical advantage. In 1903 there were under test 1342 cows in three districts—Ayrshire, Dumfriesshire, and Wigtownshire. During the second season the number of cows fell to 389. But in spite of this discouraging result the Society persevered in carrying out its scheme; and since 1905, when the number of cows tested rose to 815, progress has been steady and rapid, especially since the institution of the Milk Records Committee in the end of 1907, the numbers of cows increasing to 2688 in 1906, 3931 in 1907, 8132 in 1908, 9202 in 1909, and 9514 in 1910, while in 1911 the sudden rise to 13,965 marks a rate of advance which shows that the case for systematic and scientific testing of milk-yields has now established itself in the minds of progressive dairy farmers. To achieve this result has cost the Highland and Agricultural Society £1800 during the past nine years. It may well be questioned whether any expenditure more profitable to Scottish agriculture has ever been made. The advantages of milk-recording may appear, at first sight, to have been chiefly obtained by those who possessed animals of great milking capacity, and were able, by recording, to have the value of their stock attested, and to realise the prices which have increased from year to year for the best milking stock. But in point of fact the benefit has been widespread. The fact that the milk-yield of nearly 14,000 cows is now under systematic observation, so that a deliberate selection is going on among these animals, is of enormous consequence in the agricultural economy of the country. Its importance is attested by the kind and degree of improvement to be found from year to year in almost every recording society. If this improvement were to average only twenty gallons of milk for each cow, it might well represent an advance of 20 per cent in the net profits of dairy farming. But the effect of milk-recording goes far beyond the immediate economic gain, for the result of such a selective process is cumulative; and the creation, on so considerable a scale as has now been reached, of a breed scientifically and systematically tested for excellence in milk production, must act powerfully, through the influence of selected bulls, on the whole dairy stock of the country, and the prosperity of the milk-producing districts. Growing, as it continues to do, in popularity and influence, the practice of milk-recording, introduced at the Society's instance, has become a factor of first-rate importance in Scottish agriculture.

It is satisfactory, therefore, to know that at this stage milk-

recording has been definitely adopted as a branch of public policy in agriculture. As the result of an application by the Milk Records Committee to the Development Commissioners, the West of Scotland Agricultural College was authorised to spend a sum of £900 during the present year on the supervision and encouragement of milk-recording. The expenditure of this sum is administered by the Scottish Milk Records Committee, which thus finds itself able to continue and develop its activity in the formation of local societies and the supervision of their work.

ANALYSES FOR MEMBERS DURING 1911.

By JAMES HENDRICK, B.Sc., F.I.C., Chemist to the Society.

THE number of samples analysed for members was slightly greater than in 1910. The following table shows the number analysed during each of last five years:—

	1911.	1910.	1909.	1908.	1907.
Fertilisers	88	61	97	68	100
Feeding-stuffs	23	30	26	28	31
Waters	17	26	16	29	19
Miscellaneous	28	29	20	10	17
Total	156	146	159	135	167

FERTILISERS.

A sample was sent with a request that its value as a turnip manure should be determined. It had a strong aromatic smell, suggestive of the gas-works, and was nearly black in colour. On analyses it gave the following figures:—

	Per cent.
Loss at boiling-point (100° C.)	19·53
Further loss on ignition	63·09
Phosphate	0·13
Potash	0·04
Siliceous matter	2·15
Residue (almost entirely ferric oxide)	15·06
	100·00
Total nitrogen	4·45
Nitrogen in ammonia compounds	0·70

Ferrocyanides, sulphocyanides, sulphides, and other sulphur compounds, aromatic compounds, and various other substances, were all present.

On account of the extraordinary composition of this manure, the member was written to for further information concerning it. He replied that it was called "oxide," and had been "used for purifying gas." It was "said to contain a considerable amount of sulphate of ammonia and potash," and it was also suggested that it might make a preventive for finger-and-toe.

As the analysis shows, this substance is spent iron ore which has been used in the purifiers to clean coal-gas. It is quite unfit for use as a manure. Most of the nitrogen is not present as ammonia compounds, but in the form of sulphocyanides and other more or less poisonous compounds. There was practically no potash present, and such a manure would be a greater danger to the turnip crop than to finger-and-toe. The above description and analysis are given to warn any others who may be offered such a substance as a manure.

Guano.—Three samples of guano were below the guarantees given in one or more respects. One of them was low in all three important constituents,—nitrogen, phosphates, and potash,—and contained 30 per cent of siliceous matter, chiefly in the form of small stones and coarse gritty sand. Guanos vary greatly in quality, and purchasers of these valuable and expensive manures require so be specially careful to see that they are up to the guarantee given. They should always be purchased subject to adjustment of price if they are not found on analysis to be in accordance with the guarantee. A considerable variation from the guarantee, or the presence of a considerable percentage of sand and small pebbles, is no evidence of fraud. Guanos vary greatly naturally. The guarantee is based on a representative analysis of a large bulk, probably of a cargo, but individual portions of the bulk which have not been tampered with in any way may differ considerably from this. It is for the purchaser to protect himself by buying subject to adjustment of price on analysis.

It is very common for sellers of guano and other manures to state the percentage of potash in terms of sulphate of potash. This was done in the case of the guanos referred to above. In one of these, for instance, the invoice stated 4 per cent sulphate of potash. Four per cent of sulphate of potash is equal to 2·16 per cent of potash, so that the real guarantee was only 2·16 per cent of potash. As a matter of fact, the manure was found to contain 1·78 per cent of potash, which is equal to 3·29 per cent of sulphate of potash. There is no justification for this practice except the desire of the seller to make the percentage look as big as possible. It is not in accordance with the requirements of the Fertilisers and Feeding Stuffs Act, and it cannot be claimed that the potash is really present as sulphate. This objectionable practice requires to be checked.

It is not in the interest of purchasers or of fair dealing, and if it is allowed to continue without objection being raised, it will presently be claimed that it is the established custom of the trade, which every one understands and agrees to.

Bone-Meal.—Of nine samples sent as bone-meal no fewer than five were impure bone-meals, containing considerable admixtures of animal matters other than bone, and sometimes also an admixture of degelatinised bone. A typical sample gave the following analysis:—

	Per cent.
Moisture	7.35
*Organic matter	34.05
Phosphate of lime	45.71
Carbonate of lime	7.12
Siliceous matter	3.61
Undetermined	2.16
	100.00
*Containing nitrogen	4.81
Equal to ammonia	5.83

The figures show that this sample contains a higher percentage of organic matter and nitrogen than would be present in a pure bone-meal, while it is low in phosphates. Microscopical examination showed that it contained wool, hair, and some other ground animal matter which appeared to be ground flesh or sinew, together with a small amount of vegetable fibre.

The nitrogen and phosphates in such samples are probably of as high value as fertilisers, unit for unit, as the nitrogen and phosphates of pure bone-meal. The objection to them is not that most of those at present sold have a lower value than real bone-meals; but if it be admitted that bone-meal may be mixed with other substances, or may be made partly or wholly from degelatinised bones, it opens the door to all sorts of mixtures, and takes away from the term bone-meal the precise and well-understood meaning which it has hitherto borne. If bone-meals may be made from mixtures containing wool, hair, ground hoofs, ground skin and sinew, and degelatinised bone, it will not be very long before ground leather, bone-ash, and even ground mineral phosphates are tried by those whose consciences are flexible and can stretch to the inducement of a little extra profit.

Lime.—Fifteen samples of lime were analysed. Thirteen of these were ground limes, one a burnt lime, and one a ground limestone. Most of these were not of satisfactory quality. Four of the samples of ground lime contained less than 60 per cent of caustic lime, and three others between 60 and 70 per cent. As a rule, either no guarantee of caustic lime was given or the guarantee was not sent along with the sample. Ground

lime of good quality should [contain at least 70 per cent of caustic lime. Such a guarantee was sent to me in the case of two of the above samples.

The following table gives the analysis of the best and worst of the samples analysed, and shows the great variation in quality between samples of lime:—

	Bad Sample. Per cent.	Good Sample. Per cent.
Caustic or alkaline lime . . .	46·67	87·97
Lime in other forms . . .	24·00	3·51
Magnesia . . .	4·87	1·63
Ferric oxide and alumina . . .	3·64	1·22
Sulphuric anhydride . . .	1·36	0·84
Silica (sand, &c.) . . .	17·52	2·15
Carbon dioxide, &c. (by difference) .	1·94	2·68
	100·00	100·00

In the case of the bad sample much of the silica was present, not as sand, but as silicate of lime. This accounts for a considerable part of the "Lime in other forms," and reduces the amount of caustic lime in the sample. There was a dispute about this sample, and the sellers produced an analysis showing a much higher percentage of caustic lime than that shown above. In this the lime present as silicate appears to have been estimated as caustic lime.

Considering how large a proportion of the samples of ground lime were found unsatisfactory, it seems evident that purchasers of this fertiliser require to take special care to see that what they get is of good quality. They should insist on a minimum guarantee of caustic lime, and have the guarantee checked by analysis.

Ground Mineral Phosphate.—This is a phosphatic manure which might often be used where a cheap, slow-acting phosphate containing an excess of lime is required. It has the advantage over slag that the phosphate costs much less per unit than in slag. On the other hand, the phosphate is not so available as that in slag. In most cases it contains a considerable amount of carbonate of lime, in addition to phosphate of lime, and thus supplies available lime to the soil. Two samples were received for analysis. Neither of them was as finely ground as is desirable. This manure should be at least as finely ground as slag. Both of these samples were much coarser than standard slag samples.

Feeding-stuffs.

Linseed - cake.—Two samples of abnormal composition were received from a member who took them from different deliveries of the same purchase of cake. The guarantee given in the

invoice was oil 9 per cent and albuminoids 29 per cent. The analysis of these samples are given in Nos. 1 and 2 of the following table :—

	1	2	3
	Per cent.	Per cent.	Per cent.
Moisture	11·20	11·48	12·59
Oil	7·62	7·18	5·39
*Albuminoids . . .	26·38	26·94	16·94
Soluble carbohydrates .	38·29	36·97	36·93
Fibre	9·78	9·82	20·19
†Ash	6·73	7·61	7·96
	100·00	100·00	100·00
*Containing nitrogen .	4·22	4·27	2·71
+ „ siliceous matter	1·32	1·84	2·54

Both are poor, hard-pressed cakes, low in oil and albuminoids. As a rule, when a cake is low in oil it is high in albuminoids, and hard-pressed samples of linseed-cake usually contain over 30 per cent of this constituent. But the most remarkable feature of these samples was that they yielded the poison hydrocyanic, or prussic acid, in amount far beyond that which is ordinarily found in linseed. No. 1 yielded 0·022 per cent, and No. 2 no less than 0·041 per cent of this powerful poison. It is well known that linseed commonly contains a small amount of the glucoside *phaseolunatin*, which, when broken up by the moistening and crushing of the seed, or in the digestive system of animals, yields hydrocyanic acid. This is the substance which was found in the poisonous Java beans which caused so much trouble a few years ago. As a rule, linseed contains only a very small quantity of this glucoside, and when found in very small quantity only it is harmless. For instance, traces are found in many of the ordinary kidney beans commonly used as food for man and other animals. In this case, however, the amount found was considerably greater than I have ever found before in any sample of linseed-cake, and is an amount which certainly approaches the danger limit. The seed from which this cake was made was probably a low quality, badly ripened seed. It also appears to have been not too clean. It is seldom that linseed-cake made from well-cleaned seed contains more than one per cent of siliceous matter.

The analysis No. 3 in the above table is that of a sample of Bombay cotton-cake, which was much below the average in albuminoids. Average cake of this kind contains about 19 per cent of albuminoids. This sample was also not too clean. It contained too much siliceous matter, which consisted mainly of sand.

Compound Cakes.—Cakes of this class are those which most require looking after. The names under which they are sold, as a rule, mean nothing, and imply no guarantee of composition or quality. The terms linseed-cake and soya cake have a definite meaning, and imply a definite guarantee of composition, but compound cakes are sold under all manner of fancy names, and may be made from all manner of materials. There are a great many minor oil-seed residues and other by-products on the market, which are in themselves excellent materials, and which may be used in making wholesome and nutritious mixed cakes, which can be sold cheaper than cakes made entirely of such an expensive and popular material as linseed; but, on the other hand, there are also on the market a great variety of ground husks, screenings, sweepings, and other low-grade materials, which may also have a tendency to find their way into compound foods, unless purchasers take care to let it be known that they will not buy compound cakes unless they are of high quality and free from such low-grade materials. The purchaser should look not merely to the percentages of oil and albuminoids contained in the cakes, but also to the percentages of fibre and siliceous matter. While he should see to it that he gets a good percentage of oil and albuminoids, he should also see that the fibre and siliceous matter are not too high. It would be useful if sellers could be persuaded to give a guarantee that these constituents were below a certain maximum, say 10 per cent in the case of fibre and 2 per cent in the case of siliceous matter. This would be much more useful than the guarantee of "carbohydrates," which is sometimes given, and which means very little.

During 1911 three samples of compound cakes were received, and not one of them was entirely satisfactory, from which it would seem that the above remarks are not entirely uncalled for, even in the case of cakes purchased by members of this Society. The analyses of these three samples are given in the following table:—

	1	2	3
	Per cent.	Per cent.	Per cent.
Moisture	12·92	10·37	12·24
Oil	8·30	9·33	9·95
*Albuminoids	18·00	22·00	20·00
Soluble carbohydrates	42·87	39·30	36·72
Fibre	9·16	10·42	12·40
†Ash	8·75	8·58	8·69
	100·00	100·00	100·00
*Containing nitrogen	2·88	3·52	3·20
†Containing siliceous matter	3·05	2·87	2·19

These cakes were up to the guarantees of oil and albuminoids given with them, but they were all too high in siliceous or sandy matter, and two of them, Nos. 2 and 3, were also high in fibre. No. 1, which is below 10 per cent in fibre, is also low in the most valuable constituent of feeding-stuffs, the albuminoids, while it contains far too much sandy matter. No. 3, which was described as a fattening cake, contained a great deal of fibre, which was largely in the form of earthnut husks. Of course, if these cakes are cheap enough, they may be worth buying in spite of the high fibre—just as Bombay cotton-cake, which ordinarily contains 20 per cent of fibre, derived from the husk or hull of the cotton seed, is worth buying, as it is a very cheap cake; but, as a rule, compound cakes are very much dearer than Bombay cotton-seed cake.

Pea Shells.—Two samples were received under the name of pea shells. One of these was described as gram shells, the other as derived from some other Indian pea. These are examples of the poor husky by-products referred to above, of which there are great quantities upon the market. The analyses of these samples are given in the table below:—

	1	2
	Per cent.	Per cent.
Moisture	11.74	11.80
Oil	0.72	0.68
Albuminoids	4.25	7.69
Soluble carbohydrates	37.56	41.57
Fibre	41.77	34.24
Ash	3.96	4.02
	100.00	100.00
Containing nitrogen	0.68	1.23
Containing siliceous matter	0.21	0.24

No. 1 has about the value of a sample of straw. It consisted practically entirely of the shells and husks of grain. The other sample, No. 2, is a little better, as it contained a small amount of meal derived from the flesh of the peas from which it had been prepared, but its value also is very low. Such materials are only worth buying when straw and other coarse fodders of the farm are scarce. Even then the price should be very low, or it is safer to buy straw, the exact nature and value of which is at least definitely known.

Miscellaneous Samples.—The composition of two of these is shown in the table on page 314.

No. 1 was a sample of bran. So far as the chemical composition goes there is nothing to complain of, and it is very free from siliceous matter. It was found, however, to be swarming

with mites. When examined with a low power of the microscope it was seen to be simply alive with them. Such a food

	1	2
	Per cent.	Per cent.
Moisture	13.63	10.57
Oil	3.41	5.06
*Albuminoids	14.31	10.82
Soluble carbohydrates	53.80	64.05
Fibre	9.69	2.31
†Ash	5.16	7.19
	100.00	100.00
*Containing nitrogen	2.29	1.73
†Containing siliceous matter	0.05	2.57

is not sound or fit to be given to stock. This is an example of another kind of danger which is sometimes met with in by-products which are used as cattle foods.

The sample No. 2 was described as waste flour. It was dirty-grey in colour, and contained an appreciable quantity of fine coal-dust and other dirt. Though it is mainly derived from wheat a considerable part of it was not flour, but consisted of other parts of the wheat-grain. This is shown by the fact that the oil, fibre, and ash are all very much higher than in wheat-flour. The sample also contained a good deal of fine sandy matter.

Miscellaneous.

Wireworm Destroyer.—This substance was sent as a manure said to contain $2\frac{1}{2}$ per cent of ammonia, and which had been bought chiefly for the purpose of killing wireworms. It contained 2.9 per cent of nitrogen, equal to 3.5 per cent of ammonia. Its principal constituent was rape-meal, but other vegetable matters were present. Rape-meal is used to a large extent as a manure, and, per unit of nitrogen, fetches an excessively high price for this purpose. It is often said to have some effect in destroying wireworms, and is sometimes used for this purpose. If it was really able to kill wireworms, it would be well worth the price paid for it. Unfortunately it does not do so, and any effect it has upon them seems to be due to the fact that, when mixed with the soil as manure, the wireworms feed on it and so are prevented for a time from feeding on the crop. It is very questionable if such an action will be in the long-run beneficial. The wireworm is not easily destroyed, and it is difficult to find any substance which can be economically applied to the soil to kill so hardy an organism.

A few samples were received of substances which are used in agriculture on account of their poisonous properties to destroy weeds and fungoid pests, or to act as preservatives by destroying micro-organisms. One of these was a sample of creosote-oil, and two were samples of sulphate of copper or bluestone. All of these were of good quality. At present the farmer gets no guarantee with these articles such as he gets with Fertilisers or Feeding-stuffs. They are included, however, under the new "Sales for Agricultural Purposes Bill," which was recently before the House of Lords. As they are sometimes adulterated, or of inferior quality, it is certainly worth while to have them tested by analysis occasionally.

THE CEREAL AND OTHER CROPS OF SCOTLAND FOR 1911, AND THE WEATHER OF SCOTLAND IN 1911.

THE CROPS.

THE following comparison of the cereal and other crops of 1911 with those of the previous year has been prepared by the Secretary of the Society from answers to queries sent to leading agriculturists in different parts of the country.

The queries issued by the Secretary were in the following terms:—

1. What was the quantity, per imperial acre, and quality of grain and straw, as compared with last year, of the following crops? The quantity of each crop to be stated in bushels. What quantity of seed is generally sown per acre?—(1) Wheat, (2) Barley, (3) Oats.
2. Did the harvest begin at the usual time, or did it begin before or after the usual time? and if so, how long?
3. What was the quantity, per imperial acre, and quality of the hay crop, as compared with last year, both as regards ryegrass and clover respectively? The quantity to be stated in tons and cwts.
4. Was the meadow-hay crop more or less productive than last year?
5. What was the yield of the potato crop, per imperial acre, as compared with last year? The quantity to be stated in tons and cwts. Was there any disease? and if so, to what extent, and when did it commence? Were any new varieties planted, and with what result? .

6. What was the weight of the turnip crop, per imperial acre, and the quality, as compared with last year? The weight of the turnip crop to be stated in tons and cwts. How did the crop braird? Was more than one sowing required? and why?
7. Were the crops injured by insects? State the kinds of insects. Was the damage greater or less than usual?
8. Were the crops injured by weeds? State the kinds of weeds. Was the damage greater or less than usual?
9. Were the pastures during the season of average growth and quality with last year?
10. How did stock thrive on them?
11. Have cattle and sheep been free from disease?
12. What was the quality of the clip of wool, and was it over or under the average?

From the answers received, the following notes and statistics have been compiled:—

EDINBURGSHIRE. *Wheat*—48 bushels; straw about the same as last year; 3½ bushels sown. *Barley*—48 bushels; straw about the same; 3 bushels sown. *Oats*—44 to 48 bushels; straw light crop, less than last year; 4 bushels seed sown. *Harvest* began early in August, about three weeks earlier than last year, in fine weather. *Hay*—About 2 tons 10 cwt., about the same as last year; well got; second crop a light crop and well secured. *Meadow-hay*—Very little grown, and well got. *Potatoes*—A large crop, about 10 tons; prices about the same as last year, and no disease. *Turnips*—A light crop; 20 to 25 tons. *Mangold* a large crop; 25 to 30 tons. No damage by insects or weeds. *Live Stock*—Pastures very good; stock throve well; cattle and sheep quite free from disease. *Clip of wool*—Very good.

LINLITHGOWSHIRE. *Wheat*—48 bushels; 2 tons straw; 3 bushels drilled in; 4 bushels sown broadcast. *Barley*—48 bushels; 1½ ton straw; 3 bushels drilled in; 4 bushels sown broadcast. *Oats*—56 bushels; 1½ ton straw; 3 bushels drilled in; 5 bushels sown broadcast. *Harvest* began three weeks earlier, and about four weeks did all the work. *Hay*—2 tons; quality good. *Potatoes*—As a rule, about 2 tons per acre more; yield, say 10 tons; no disease. *Turnips*—Crop less than last year; quality good; average about 24 tons; crop brairded well. No injury by insects or by weeds. *Live Stock*—Pastures very bare, owing to dry season; stock did not thrive well; cattle and sheep free from disease. *Clip of wool*—Quality good; average clip.

HADDINGTONSHIRE (Upper District). *Wheat*—36 bushels; grain and straw of good quality; 4 bushels sown. *Barley*—32 to 34 bushels; grain and straw of better quality than last year; 4 bushels sown. *Oats*—34 to 40 bushels; quality not so good as last year; 4 bushels sown. *Harvest* began three weeks earlier than last year. *Hay*—1 ton 10 cwt.; quality better than last year. *Meadow-hay*—Less productive than last year. *Potatoes*—6 to 8 tons; no disease; no new varieties planted. *Turnips*—14 to 16 tons; crop brairded well; no resowing. No injury by insects or weeds. *Live Stock*—Pastures of poor growth and quality owing to dry season; stock throve fairly well, and were free from disease. *Clip of wool*—About an average clip.

HADDINGTONSHIRE (Lower District). *Wheat*—38 to 44 bushels; quality extra good; fair bulk of straw; seed sown, 3 bushels drilled, 3 to 4 bushels broadcast. *Barley*—44 to 52 bushels; quality a record; the fine dry summer brought up the quality to a degree never surpassed in the time of present generation; fair bulk of straw; seed sown, 2½ to 3 bushels drilled. *Oats*—40 to 48 bushels; a light crop; bulk of straw extremely small; many fields gave a wretched return per acre; seed sown 3½ to 4½ bushels, according to variety, drilled; broadcast, 1 bushel more. *Harvest*—An early harvest, began on August 1, or a fortnight sooner than average. *Hay*—Small crop owing to dry summer; 1½ to 2½ tons. *Potatoes*—“Up-to-Date” varieties 4 to 7 tons; “Langworthys,” 4 to 6 tons; “Golden Wonders,” slightly heavier, a light crop; splendid quality; no disease. *Turnips*—A miserable crop on the light coast soil, others not much heavier; 10 to 18 tons; the mildew in August and September completely ruined the crop. Green-fly did some damage; no damage by weeds. *Live Stock*—Poor grazing season; no grass at all in summer; free from disease. *Clip of wool*—A good clip.

BERWICKSHIRE. *Wheat*—In the Merse district 45 bushels—one-eighth above 1910; straw abundant; quality of both grain and straw much above average; 4 bushels seed sown. There is almost none grown in the Lammermoor district. *Barley*—In the Merse district 35 bushels, similar to 1910; straw fair in most places, quality excellent, probably the best for thirty years; in the Lammermoor district 32 bushels, similar to 1910; straw short, quality very superior; seeding in both districts, 3 to 3½ bushels. *Oats*—32 bushels in the Merse and 28 bushels in Lammermoor, considerably less than last year, and much below average; straw in the Merse also much below average, but quality very fine; in Lammermoor about two-thirds average crop of straw, quality all over excellent; seeding in both districts, 4 to 4½ bushels. *Harvest* began before the usual time by about fourteen days, and lasted the shortest time of recent years, in many cases being all over in three weeks. *Hay*—generally a short crop, 25 to 28 cwt. in the Merse, 20 to 25 cwt. in Lammermoor; quality excellent. *Meadow-hay*—About the same yield as 1910. *Potatoes*—Fair crop, similar to last year, 6½ to 7 tons. *Turnips*—Poor crop, about one-third short. Swedes variable, 16 to 18 tons; yellows and others, 12 to 15 tons. No injury by insects in the Merse. Some frost and “fly” on turnips in the end of May, but not serious in Lammermoor. Charlock the prevailing weed; weather too dry for others. *Live Stock*—To beginning of August pastures were good, after that were burned up till middle of October. Stock did well in the early part of the season, later extra feeding on a large scale had to resorted to; cattle and sheep free from disease. *Clip of wool*—About an average, quality fair, similar to last year.

SELKIRKSHIRE. *Wheat*—Very little grown, good quality; about 40 bushels; seeding, 4 bushels. *Barley*—Fine quality; 29 bushels; seeding, 3½ bushels. *Oats*—Perfect quality, both straw and grain; 27 bushels; seeding, 5 bushels. *Harvest* began earlier than usual, beautiful weather, and secured in perfect condition. *Hay*—Small crop, fine quality. *Meadow-hay*—Very small crop, first-class quality. *Potatoes*—Not quite as big, but fine quality, and well secured; about 5 tons; no disease. *Turnips*—This crop came away well but was checked by drought, and has finished just about half last year’s. There was a little resowing owing to frost. No injury by insects. *Live Stock*—Pastures were very much burned and very bare, and much extra feeding required. Stock suffered from want of moisture, and could not have thriven without box-feeding, indeed some farmers had to hay their sheep all September. Some parts of this county

suffered very much from the drought. *Clip of wool*—Average clip, good quality.

ROXBURGHSHIRE. *Wheat*—Growth of wheat slightly on the increase. Fair bulk; fair quality both as regards straw and grain; about 36 bushels; seeding about 4 bushels. *Barley*—A fine-looking crop; very fine quality; grain and good straw all harvested in first-rate order. The yield on low-lying fine corn-land good, on the second-class land disappointing; seeding from 3 to 4 bushels; average yield—say, from 28 to 42 bushels, according to quality of land. *Oats*—A very good crop on the early low-lying corn-land, but on higher secondary soils very poor, and again in some of the hill districts an abundant crop. Suffered in many cases from the excessive drought; grain thin; straw excellent, where it did not suffer from rust; seeding about 4 or 5 bushels; yield on good land, 50 bushels; on second class, 28 bushels. *Harvest* began about the 1st of August, and was all finished by the end of the month. Began quite fourteen days earlier than an average of years. *Hay*—Ryegrass hay a very light crop generally, and well secured; suffered from drought; 25 cwt. per acre. *Meadow-hay*—A very poor crop, but got in fine order; 10 to 20 cwt. per acre; less productive than last year. *Potatoes*—A fair crop; good quality; little disease; yield, 5 to 7 tons per acre. *Turnips*—Turnip crop disappointing; braided all right, but in the lower districts suffered very much from mildew, especially early sown turnips. The later sown turnips have grown during the mild winter into an average crop. Average might be 14 tons when standing; much destroyed by frost in beginning of February. Little re-sowing required. Crops not to any great extent injured by insects. No damage from weeds. The drought enabled the cultivation of the turnip crop to be thoroughly efficient. *Live Stock*—Pastures during the fore-part of the season were abundant, but latterly suffered very much from drought, and were entirely burned up—not been so deficient since 1868. Stock thrived fairly well; earlier lambs got fat, but gradually the drought told on them, and there were many small lambs and lean ewes. Cattle grazed well where they had grass; in most cases they came off the summer grazing in poor condition. As a whole they have been fairly healthy. A good many lambs died after being put on to winter keep, mostly the leaner lambs, due to the want of grass in the autumn. A good deal of sickness amongst hill hogs on some farms. *Clip of wool*—A good clip, quite an average as regards quantity and quality.

PEEBLES SHIRE. *Wheat*—None grown. *Barley*—5 quarters on good land (deep) and low-lying barley, 4 quarters on dry land. *Oats*—4 quarters. *Harvest* began ten days earlier. *Hay*—From 25 to 35 cwt., according to the class of land; all first-class quality. *Meadow-hay*—Very much the same. *Potatoes*—From 6 to 8 tons; very fine quality; no disease and no new varieties. *Turnips*—Crop braided slowly, but on the whole fairly well; a little re-sowing in the county. Swedes about 16 tons, and yellow 12 to 14, of very good quality. Reason of re-sowing, dry weather. No injury done by insects or from weeds. *Live Stock*—Pastures much below average growth. Stock thrived well; cattle and sheep free from disease. *Clip of wool*—Good quality, average clip.

DUMFRIES SHIRE (Annandale). *Wheat*—No wheat grown in this district. *Barley*—Owing to recent bad harvests the extent of land sown with barley has been getting less. Generally speaking, it has only been sown where sheep have been kept late on turnip land in the spring, and the land could not be got ready for oats. Where grown, the crop this

year may be said to be a record one for quality and yield of grain. Owing to dry summer, straw was rather short. Yield of grain, 35 to 40 bushels; seed sown, 3 to 4 bushels per acre. *Oats*—This year there was a very considerable difference between oats grown after lea and that after roots. After lea, where sown early, the bulk of straw was fairly good, though not up to an average. After roots, the crop was very disappointing—not half the bulk of an average season. On light land, and late in being sown, it was almost a failure in not a few cases. Sheep were turned on to the land in August. This shortage of crop was caused by a remarkably dry spring and summer. Dry weather set in on 12th March, and the only showers that fell during the season were from 16th April to 4th May. Slight showers on 17th, 20th, and 21st June, 1st and 2nd July, and 22nd and 23rd September. Weather broke on 29th October. Yield of both straw and grain fully a third below last year's crop. Grain, 23 to 25 bushels per acre; quality and colour good, if rather lean; straw average, 15 to 18 cwt. per acre; seed sown, 5 to 6 bushels broadcast—3 to 4 drilled. *Harvest* began about 8th of August, fully three weeks before usual time. *Hay*—Ryegrass hay benefited by the rainy period in end of May and beginning of June, and did not suffer so much from drought as grain crops. Yield from 20 to 25 cwt. per acre; quality excellent. Clover more plentiful than last season. Had the weather been damp, there would have been an unusually good crop of clover foggage. *Meadow-hay* below an average, nearly one-third; quality excellent. No rain fell during hay-harvest. *Potatoes* also suffered from the drought, although not to the same extent as other crops. The potato is commonly spoken of as a sun-plant, and owing to the unusual supply of sunshine farmers expected more than they realised at lifting. Five to 6 tons per acre would perhaps be about the average, but reports give some yields at 10 and even 12 tons. There was little or no disease. No new varieties planted. *Turnips*, favoured by mild and genial weather in the late autumn, grew wonderfully, and the resulting crop is not much below an average. Twenty tons per acre would be lifted, and this exceeded in many cases, but about 18 tons would represent the average. Early sown swedes did best. Turnips sown in June had to be resown owing to drought. Little or no damage by insects, but sparrows were numerous, and did serious damage to ripening corn. Crops were very free from weeds. The ground being so dry and heat so great, surface weeds were scarce. Deeper-rooted weeds were easily killed. The farmers' outlay on cleaning fallow crops will this year probably be the lowest on record. The damage to the pastures this year by drought makes up by far the greatest loss the farmer has sustained. Usually old pastures cover the ground, and so form some protection from drought. This season grass did not get a start, and pastures were burnt up the whole grazing season. *Live Stock*—Owing to burnt-up pasture and scarcity of water, cattle summered badly, and at autumn sales it was a common remark that not for a long time back had so many lean and ill-conditioned cattle been seen. Where beasts were forward in condition, it was generally the result of trough-feeding. Cattle and sheep have as a rule been healthier than usual. Braxy and louping-ill, especially braxy, caused some loss, but the death-roll from this cause would not equal that of last year. *Clip of wool*—Clip of excellent quality, and rather over the average.

DUMFRIESSHIRE (Nithsdale). *Wheat*—None grown. *Barley*—Very little grown. *Oats*—About 40 bushels; 15 cwt. straw. In Lower Nithsdale crops were very light on dry gravelly land for want of rain. In the Upper part the crop was quite an average, and all over excellent quality. *Harvest* quite two weeks before the usual time. *Hay*—About 1½ tons,

which is half a ton below average. *Meadow-hay* less by about one-third. *Potatoes*—Six tons, one ton more than last year, in the Upper part of the valley. Five and a half tons on the dryer land. No disease. A few new varieties planted, but not of sufficient extent to give a quotation. *Turnips*—The average would be about 15 tons. The braird was very indifferent, and a good deal of second sowing was required. The damage was worse by turnip-fly and wire-worm than usual. No injury from weeds. *Pastures* under average and much injured by drought. *Live Stock* thrived better than could be expected from their bareness. Cattle and sheep free from disease. *Clip of wool*—The quantity of wool was above an average, and first-rate quality.

DUMFRIESSHIRE (Eskdale). *Wheat*—None grown. *Barley*—None grown. *Oats*—On account of drought the crops were light, the straw being short, although some crops turned out well and would be quite up to in average, and all seem to be threshing well. Seed sown, about 5 bushels. *Harvest* commenced earlier than usual, about a week or so, and was splendid weather all the time. *Hay*—Crop light owing to drought, and would be about 28 cwt., and was got in splendid condition. *Meadow-hay*—Light, being short and not well grown at bottom, but all got in splendid condition. It must be a very long time since it was all so well got in. *Potatoes*—About 6 tons; not much disease, and no new varieties planted. *Turnips*—About 18 tons and very good quality; braired very unsatisfactorily, especially first sow, as they just braired here and there, and were very bushy. A lot were sown over, but in many cases, had they been left alone, they would have come all right, as the seed which was harrowed out when harrowed down the stitches to resow, all grew between the stitches. The fly was bad, no doubt with it being so dry. No weeds, as it was splendid weather for killing all that were pushed out when hoeing. *Live Stock*—Pastures, quality would be good, but mostly badly burned up with drought. Stock did well where pastures were not burned up; cattle and sheep very free from disease, although a lot of sheep are said to have died on turnips. *Clip of wool*—Under the average.

KIRKCUDBRIGHTSHIRE. *Wheat*—None grown. *Barley*—None grown. *Oats*—Under an average; yield of grain, 40 bushels per acre; straw, 1 ton. *Harvest* commenced a week earlier than last year, and uninterrupted fine weather prevailed. *Hay*—Hay crop was droughted early in June, and never recovered, and in consequence its yield was very light, 20 to 25 cwt. per acre being common on well-farmed land. *Meadow-hay*—Water meadows were exceptionally good, yielding 35 cwt. per acre, and got in splendid condition. *Potatoes*—Early potatoes were checked by the June drought, and although they eventually became a good average crop, the yield was considerably below the two preceding years. $7\frac{1}{2}$ to 8 tons per acre would represent the average yield. No disease. Late varieties a short crop—7 tons per acre. No new varieties. *Turnips*—Resowing had to be resorted to, and in consequence the proportion of yellows was increased and swedes diminished. The former at the end proved a good crop—20 tons. Swedes indifferent and patchy, 15 tons. There was some wire-worming in oats in May. *Weeds*—Drought-wasted oats suffered from annual weeds, chiefly redshank and spurry. *Pastures* very short in summer, and exceptionally good in autumn. *Live Stock* thrived well. Cattle and sheep free from disease.

WIGTOWNSHIRE. *Wheat*—Very little wheat grown in this county, but where it was grown this year a good crop, from 38 to 40 bushels per acre;

quality of both grain and straw excellent. About 4 bushels sown to the acre. *Barley*—Not much barley grown; straw rather short, but quality of grain very good, running from 36 to 40 bushels per acre. *Oats*—The crop of oats, owing to the very dry summer, was a very variable crop. On some moss land, on lake land, and deep loamy soil the crop was quite an average, but on light thin land the crop, when gathered in, would be the smallest for a generation anyway. Yield of grain from 30 to 42 bushels; straw very fine quality. *Harvest* was quite general before the middle of August; the weather was quite fine while it lasted, and most of the grain hardly got a shower. The longest time occupied would not be more than a month. *Hay*—On hard land the hay crop was very light. On some deep, well-farmed land the crop was very heavy. Quantity would vary from 20 to 40 cwt. per acre. The quality very good. *Meadow-hay*—Mostly a very good crop, much better got than last year, varying from 15 to 30 cwt. per acre. *Potatoes*—A very fine crop, varying in yield from 6 to 13 tons per acre; scarcely any disease. *Turnips*—In some parts of the county, about time of the summer, owing to "fly" and the seed not brairding, we thought the turnip crop was to be a failure. However, fears have been disappointed, and I think all over there is a very good crop, running from 15 to 25 tons per acre. No injury by insects. *Weeds*—In some fields runch and charlock did a lot of harm. *Pastures*—Very rapid growth in the beginning of the season, but got dried up in August with the prolonged drought. *Live Stock*—Stock did well at beginning of season, but did not thrive so well later on as last year; cattle and sheep free from disease. *Clip of wool*—Quantity and quality much about average.

AYRSHIRE. *Wheat*—40 bushels, quality good; 35 cwt. straw; seed, about 3 bushels. *Barley*—38½ bushels; 22 cwt. straw; seed, 3 bushels. *Oats*—44½ bushels; 24 cwt. straw; seed, 4 to 6 bushels. The exceptionally dry season caused a very short crop of oats. *Harvest* began and finished early, and all kinds of cereals were secured in the best possible condition. *Hay*—29½ cwt.; quality good and usually well got. *Meadow-hay*—34½ cwt. Quality good. *Potatoes*—8 tons 5 cwt.; exceptionally free from disease; no new varieties planted. *Turnips*—The crop was estimated to produce 19½ tons per acre at the beginning of November, but any left growing after that date increased in weight by several tons per acre. Early sowing brairded well, but those later lay in the ground for weeks till rain came to germinate the seed. Not more than usual injury by insects. Damage from annual weeds was rather less than usual, groundsel, chickweed, &c. *Live Stock*—Pastures—After a late spring a rapid growth set in, and for a few weeks in May grass was abundant, but the drought affected nearly all pasture, which was latterly very bare. Stock thrive very well where they had sufficient grass or other feed; cattle and sheep free from disease. *Clip of wool*—Quality good, and about average quantity.

BUTE. *Wheat*—About 12 acres grown this year, — the first for a good many years in Bute. Grain and straw excellent quality; produce 36 bushels; 4 bushels sown. *Barley*—Less than usual sown this year; an abundant crop; straw average; 50 bushels; grain excellent; natural weight, 56 lb. per bushel; 3½ bushels sown. *Oats*—An average crop, except on very light land; grain and straw good quality, and harvested in good condition; 40 bushels; 5 bushels sown. *Harvest* earlier than usual. Began cutting 15th August. *Hay*—Under average, but well got; about 1 ton 10 cwt. per acre. *Meadow-hay*—Very little grown; similar to last year; crop, 1 ton 5 cwt. *Potatoes*—Early potatoes under aver-

age; about 8 tons per acre; started digging 18th June; late potatoes 10 tons per acre; very little disease; new variety—"Glen Castle Kidney"; a good crop, and free from disease. *Turnips*—Superior to last year; crop 26 tons; quality extra good; braided slowly. No injury from insects; no injury from weeds. *Live Stock*—Pastures above an average, except on very light land early in the summer. Cattle did well; cattle and sheep free from disease. *Clip of wool*—A fair average.

ARRAN. *Wheat*—None grown. *Barley*—None grown. *Oats*—About 32 bushels; harvest rather earlier than 1910; straw very short on light sown-out land; grain lighter in weight than usual; seed sown, about 5 to 6 bushels. *Harvest* fully earlier than usual. *Hay*—Lighter crop than last year, say, about 1 ton; quality good, being well secured; seed very heavy. *Meadow-hay*—Crop about usual; quality good. *Potatoes*—Large crop on good potato land; on whole above average—say, 7 tons per acre; some disease made appearance in September. One party introduced a special new variety, sold at a big price. *Turnips*—Very variable; a good deal of finger-and-toe; say, about 15 tons; braided well where early sown; late sowing did not do so well. Insects about usual; in fact fly did less damage; finger-and-toe should have special attention through investigation, as a lot of money is lost through damage on land long under turnip, although over six-course rotation. Less than usual damage by weeds. *Live Stock*—Pastures very bare in June; improved later with a good back-end; quality good on deep land; stock thrived very well; sheep very bad with maggot; could attention not be given to a dip to solve the difficulty? Cattle and sheep free from disease. *Clip of wool*—Rather above average; quality good.

LANARKSHIRE (Upper Ward). *Wheat*—None grown. *Barley*—Practically none grown. *Oats*—25 to 30 bushels; about one-fourth less than an average year, and straw correspondingly deficient in quantity. Both grain and straw of excellent quality, but owing to exceptionally dry summer the crop was much smaller than usual; 5 to 6 bushels seed sown. *Harvest* began in the end of August, about a fortnight or three weeks earlier than usual, and with excellent weather the crop was well and quickly secured. *Hay*—Average $1\frac{1}{2}$ ton—similar to last year; aftermath deficient owing to dry weather. *Meadow-hay*—Similar to last year, and well secured. *Potatoes*—A good crop, averaging from 7 to 8 tons, and rather better than the preceding year; very little disease; no new varieties planted to any extent. *Turnips*—Average from 16 to 20 tons; being rather less than last year, occasioned by the dry season. Crop did not braird so well as usual, and resowing was needed to a greater extent than is usual. Injury by insects not more than usual. Damage by weeds not to a greater extent than usual, and being mostly of a surface character were easily dealt with. *Live Stock*—Pastures good at beginning of season, but failed earlier than usual; stock thrived well, but had to be put on hand-feeding earlier than usual; cattle and sheep were in the main free from disease, but death-rate among sheep in latter end of year rather heavier than usual. *Clip of wool*—Quantity and quality average.

LANARKSHIRE (Middle Ward). *Wheat*—The weather during season 1911 was extremely dry and warm, and suited the growth of crops over the larger area of this Ward. The wheat crop was the best reaped for many years; the quantity and quality of the grain and straw were both good; grain, 35 to 48 bushels; straw, 35 to 40 cwt.; seed sown, $3\frac{1}{2}$ to 4 bushels. *Barley*—None grown. *Oats* were a good crop, although in

some parts deficient in straw, and are threshing very well to the bulk in stackyard; grain, 45 to 55 bushels; straw, 28 to 35 cwt.; seed sown, $4\frac{1}{2}$ to 5 bushels. *Harvest* commenced about the middle of August, and the weather conditions were particularly favourable. No damage was caused to crops, and all the crops were gathered in good condition, and with little expense. *Hay*—Ryegrass and clover-hay were good crops where the lands were in good condition, but on inferior lands the crop was light. Weights ranged from 1 to $2\frac{1}{2}$ tons per acre. The hay was got in good condition, and during July and the beginning of August sales were made at about £3 per ton. Since then hay has realised £4 to £4, 10s. per ton. *Meadow-hay* and *Timothy* gave a yield of $1\frac{1}{2}$ to 3 tons. *Potatoes*—1911 was an especially suitable year for the growth of potatoes. There have been fair crops, with freedom from disease, and the average yield would be from 8 to 14 tons. *Turnips* have been a very middling crop, and very variable. The yield would be from 10 to 30 tons. There was no damage by insects or finger-and-toe. *Live Stock*—Store stock for pasture was extremely high in price. In the early part of the year pasture was plentiful, but during midsummer, owing to the drought, pasture became exceedingly bare. This circumstance, accompanied by the fall of prices in live stock, left very little for graziers. Cattle and sheep have been fairly free from disease. There are practically no sheep in this Ward.

LANARKSHIRE (Lower Ward). *Wheat*—50 to 55 bushels; better yield than last year; quality excellent; straw about 2 tons, rather under last year; 4 bushels seed sown. *Barley*—Nil. *Oats*—40 to 50 bushels; quality good; straw, owing to dry weather variable in quantity, 1 to 2 tons according to soil and condition; 6 bushels seed sown. *Harvest* began from ten to fourteen days earlier than the usual time, from middle to end of August. *Hay*—Ryegrass and clover under average, about 30 cwt. per acre; quality very good; *Timothy* about an average in quantity; of good quality. *Meadow-hay*—Nil. *Potatoes*—Potato crop much heavier yield than last year; 10 to 15 tons per acre; no disease; quality good; same varieties. *Turnips*—Turnip crop affected by drought but improved very much previous to lifting-time; 12 to 20 tons per acre; crops generally braided well; no resowing. No injury from insects or weeds. *Live Stock*—Pastures good till midsummer; stunted by drought afterwards; stock thrived well; cattle and sheep free from disease. *Clip of wool*.—Nil.

RENFREWSHIRE. *Wheat*—From 42 to 46 bushels; very good crop; better than last year; about 4 bushels for seed; quality of both grain and straw beyond average. *Barley*—None grown worth taking into account. *Oats*—About 46 bushels; did not thresh out well; quality very good; straw short, especially so on land to be sown out after green crop; about 20 cwt. straw over all. *Harvest* began about ten days earlier than last year, and was a very good one. *Hay*—The hay crop was rather lighter, but of exceptional quality owing to the good weather; 1 ton 15 cwt.; Ryegrass and clover very good this year. *Meadow-hay*—None grown. *Potatoes*—The crop was heavier; 10 tons average; no disease; "Rising Sun" was planted. *Turnips*—25 tons; better quality than last year; braided as a rule well; resowing rare; caused by want of rain. No injury by insects or by weeds. *Live Stock*—Pastures during the season of average growth and quality with last year, except on light lands, where they suffered from drought; stock thrived very well indeed; cattle and sheep free from disease. *Clip of wool*—Much the same as formerly.

ARGYLLSHIRE (Lochgilphead). *Wheat*—None grown. *Barley*—None grown. *Oats*—Much the same as last year, about 6 quarters per acre; quality very good; seed, $4\frac{1}{2}$ to 5 bushels. *Harvest* began a day or two earlier than last year. *Hay*—Ryegrass just about last year's crop, $1\frac{1}{2}$ tons per acre; quality very good. *Meadow-hay* a very good crop, and in most cases well got; about $2\frac{1}{2}$ tons. *Potatoes* a very good crop, unless when damaged by June frosts; about 6 tons; very little disease; no new varieties planted. *Turnips*—Turnip crop not so bulky as last year, except in a few exceptional cases where there were very big crops. About 22 tons average. A good deal of finger-and-toe. Crop stiff to braird in many cases owing to drought; no second sowing. Turnips a good deal injured by fly; more than usual. Very little trouble with weeds this year. *Live Stock*—Pastures were of quite average growth, and excellent quality; stock thrived very well; cattle and sheep have been free from disease. *Clip of wool*—The quality of the clip was very good, and was a good bit over the average.

ARGYLLSHIRE (Kintyre). *Wheat*—None grown. *Barley*—Straw much the same as last year; grain not so good, about 36 bushels; seed, about 4 bushels; well harvested. *Oats*—Straw about the same as last year; grain not turning out as well, from 40 to 50 bushels; seed, about 3 bushels. *Harvest* began about a fortnight earlier than last year, and quite a good one. *Hay*—Ryegrass hay quite as good as last year and well got, about 2 tons per acre. *Meadow-hay* crop about the same, but much better got. *Potatoes* better than last year, 7 to 9 tons; very little disease. *Turnips*—Much the same as last year, 25 to 30 tons on the good land; braided well; very little second sowing. No injury by insects. Weeds—not to any extent. *Live Stock*—Pastures, unless on very light land, better than last year; stock thrived extra well; cattle and sheep free from disease; less braxy than usual till within the last month. *Clip of wool*—Rather over the average, both as to quantity and quality.

ARGYLLSHIRE (Islands of Islay, Jura, and Colonsay). *Wheat*—None grown. *Barley*—Very little grown. *Oats*—Very good average crop; 5 bushels of seed sown. *Harvest* started at least a fortnight before the usual time and the crop was secured in first-class order. *Hay*—Crop slightly heavier than last year, but not as heavy as in 1909. It was secured in excellent condition. *Meadow-hay*—Crop much the same as last year. *Potatoes*—Slightly heavier than last year; on the whole a very good crop, nice quality, and little disease. *Turnips*—Very similar to last year; good average crop; did not braird well, and in some cases re-sowing was necessary, but crop recovered during summer and finished well. Not more than usual injury by insects. Weeds much the same as last year. *Live Stock*—Pastures suffered from drought in the early part of June, but recovered later; stock thrived well; death-rate from disease not greater than usual. *Clip of wool*—Much the same as last year, rather above the average both in quality and quantity.

DUMBARTONSHIRE. *Wheat* was a good crop, with an average return of 34 bushels per acre; quality of grain very good; straw about 2 tons. *Barley*—None grown as far as I could hear. *Oats*—Average about 36 bushels of grain of good quality; straw generally light, especially after green crop. *Harvest* began about fourteen days before the usual time. *Hay* was lighter than last year, yielding about $1\frac{1}{2}$ tons per acre, but the quality was good. *Meadow-hay* was lighter than last year owing to dry weather; quality good. *Potatoes* would yield about 7 tons per acre; a fair good crop; very little disease. No new varieties planted.

Turnips were a little irregular; early sowings did well, but those sown late in May and beginning of June did not always braid, as the ground was too dry and some resowing was needed; quantity about 22 tons per acre. No damage by insects. No damage by weeds, as land was easily cleaned owing to dry weather. *Live Stock*—Pastures were good early in the season, then got bare about June but recovered in July, and were altogether a good average; stock thrived very well, rather above the average; cattle and sheep free from disease. *Clip of wool*—The quality of the wool was good, and weight was decidedly above the average.

STIRLINGSHIRE (Western District). *Wheat*—None grown in district. *Barley*—None grown in district. *Oats*—About 30 bushels; grain good, and straw of like quality but short, particularly in red land; average seed, 5 bushels. *Harvest* began two weeks earlier than last year. *Hay*—Crop was lighter than usual, and would average about 1 ton; good quality and well got, but short of clover. *Meadow-hay*—Rather under average on account of dry season. *Potatoes*—Average about 8½ tons per acre; excellent quality and little or no disease; no new varieties planted. *Turnips*—Average about 18 tons per acre; quality good, but roots not so large as usual; crop did not braid well owing to drought, and in many cases a second sowing was necessary. No injury by insects or from weeds. *Live Stock*—Pastures not quite so good as last year, especially on light land; stock thrived fairly well; cattle and sheep free from disease. *Clip of wool*—Good quality and above average.

STIRLINGSHIRE (Eastern District). *Wheat*—3 bushels seed; a very good crop all over; 48 bushels; yield of very fine quality. *Barley*—4 bushels seed; rather poor crop on the whole; short of straw; 40 bushels; yield of fine quality, and has malted well. *Oats*—5 bushels seed; very short crop but well got; 38 bushels; yield of good quality. *Harvest* began ten days earlier. *Hay*—Fair crop, not so good as last year; 40 cwt. per acre. *Meadow-hay*—Shorter crop, but well got. *Potatoes*—Good year for potatoes; no disease; 8 tons per acre; very fine quality. *Turnips*—A very middling crop all over; braided well, but too dry; 20 tons per acre; no second sowing. No insects. No injury by weeds. *Live Stock*—Pastures very deficient; too dry; stock thrived middling; cattle and sheep free from disease. *Clip of wool*—A very good clip of wool, which has made good prices.

CLACKMANNANSHIRE. *Wheat*—On heavy well-farmed land wheat was the best grain crop of the season; of good average quality, although a little under the average in bulk; the crop was well harvested; yield from 38 to 42 bushels; 3½ to 4 bushels sown. *Barley*—Owing to the dry weather all through, barley is considerably under the average as to quantity both in straw and grain, but more especially in straw; the quality of barley is above the average for a number of years back; secured in excellent condition; yield 30 to 35 bushels. *Oats*—On ordinary land oats were much under the average in bulk, and on thin dry land were very deficient, straw being very short; the quality of oats was a fair average, and where there was a fair grown crop the quality was above the average; the yield varied very much—on fields where straw was very short it did not exceed 20 bushels, and where there was a fair crop up to 48 bushels; all well got and stacked in good order; 4 to 5 bushels sown. *Harvest* commenced this year from ten days to a fortnight earlier than usual and earlier than last year, it being a record harvest, the bulk of the grain crop having been cut and secured without getting a shower. *Hay*—In heavy carse land hay was a fair crop, not much under

the average, and of excellent quality ; but on dry field land the crop was much under the average in bulk and quality ; the dry weather which stunted the hay crop made it hard and dry in the stalks. *Meadow-hay*—This crop was a good bit under the average in bulk, but having been secured in good condition it is of fair quality. *Potatoes*—On most lands, except where the soil is dry and sandy, there was a fair average crop of good quality, and in more favoured situations as to moisture the crop was above the average in bulk and quality ; not much disease ; yield, 7 to 8 tons. *Turnips*—This crop is rather disappointing owing to the dry weather, and consequently the difficulty in getting a braird, the crop is patchy and much under the average ; the yellow turnips are not keeping well in the pits ; it is difficult to estimate the yield, it varies so much. A good deal of damage was done to medium sown turnips by the turnip fly. Wire-worm did some damage to potato sets after having been planted. There was more damage done by insects than usual. On account of the dry summer weather the weeds were easily kept down ; there was less damage than usual. *Live Stock*—Pastures—The grass was not so plentiful as last year ; it suffered in many places from drought, and got very scarce towards the end of the season. Stock thrived fairly well on the grass, more especially where it was not over-stocked at the beginning of the season ; little or no disease amongst cattle or sheep ; even foot-rot was not as bad as usual. The *Clip of wool* was no more than an average one as to bulk, but was of fair average quality, and for which good prices are got.

FIFESHIRE (Middle and Eastern District). *Wheat*—Wheat was a very good crop ; about 38 bushels ; quality of both grain and straw superior to previous years ; 3 to 3½ bushels a usual seeding. *Barley*—A small crop ; very small on thin light land ; fairly good on deep land ; about 28 bushels ; quality of grain very good, better in the late districts than has been known for many years ; straw soft and of poor quality ; 3½ to 4 bushels per acre a usual seeding. *Oats*—A small crop, very short, except on deep land ; about 36 bushels ; quality moderate, but all in very fine condition ; 4 bushels, up to 5½ of some new varieties, a usual seeding. Owing to severe drought the crops were poor in early dry districts, and good in late wet districts. *Harvest* began earlier than usual ; about three weeks. *Hay*—About 1 ton 15 cwt. Quality superior to previous years except on thin land, where it became too ripe and dry. *Meadow-hay*—More productive. *Potatoes*—Rather over previous year's crop, and as there is almost no disease, a larger quantity per acre will be saleable. Crop may be about 5½ to 6 tons. *Turnips* suffered severely from the drought in autumn ; less than half the crop of the previous year ; quality also inferior to previous year. Crop may be about 13 tons per acre average. Braird was good, and little resowing. The crops were injured to some extent by wire-worm ; not more than usual. Little injury by weeds, owing to dry season. *Live Stock*—Pasture during May growth was good, but very little during the remainder of the season. Where there was sufficient grass, stock thrived well ; but in very few cases was there sufficient grass, and a great deal of extra food had to be used to keep the stock in fair condition. Cattle and sheep free from disease. *Clip of wool*.—A good average.

FIFESHIRE (Western District). *Wheat*—In a district such as West Fife, where the conditions as to soil and climate alter so rapidly from the fine soils along the coast to the inferior and even very poor lands farther back, it is difficult, the more so in a season like the past, to give, even approximately, the quantities of grain and straw per acre, but, speaking generally

of the different localities mentioned, on the finer lands both wheat and barley an uncommonly fine crop. The quality is exceptionally good, and the bulk of straw good also, especially wheat; but as you go farther inland quantities decrease somewhat, although with such a fine dry season it is wonderful to have seen such crops, even in the later and poorer soils. *Barley*—The above remarks also apply to barley. If the seed be sown by the hand, which it usually is on the hillside farms, an allowance of 4 bushels per acre of wheat and $3\frac{1}{2}$ of barley is ample, but if sown by a machine a somewhat reduced quantity will suffice; but in both cases much depends on both land, climate, and tilth. *Oats* are a disappointing crop generally, being very short of straw and thin on the ground, and although threshing out well to the stalk (but of which there are too few of them) are not a good crop to the acre, but are everywhere of fine quality and weight, and the fodder never was better for eating purposes. *Harvest*—One of the finest, earliest, and quickest harvests on record, and the older generation of farmers require to go back to the fine harvest of 1868 to find its equal, and may the younger generation find many more like this one in their lifetime, as the older ones have sadly to look back on the many disastrous ones they have come through; in the one life is a pleasure and gain, in the other a drudge and black loss. *Hay*—Ryegrass and clover-hay was very short in bulk, but exceptionally fine quality, and therefore was easier managed. *Meadow-hay*—Rather short in bulk compared with ordinary seasons, and entirely due to the long severe drought, but the quality never was better or easier harvested. *Potatoes*—Potatoes, like other things, looked rather poor and miserable during the excessive drought, but after the first rains fell they took a new lease of life, and have finished up a fine bulky crop of the best of quality, and mostly free of all disease, and as the tubers are of big size and beautifully shaped, there will be little refuse for feeding purposes. *Turnips*—During the height of the drought this crop looked like being an entire failure the whole country over, and the young plants had for long a terrible struggle to live, but since the rains came in October the transformation has been great, the crops now being in many districts quite fair, indeed in West Fife the crop is good with slight exceptions. Many lost faith and sowed twice and three times over, but all of no avail, and would have been better to have waited patiently for the first-sown seed which had never braided. Injury by insects nothing to speak of. No injury by weeds. *Live Stock*—Pastures very much burnt up, the exceptions being very old pastures, lying on a cool to moist subsoil. When stock had grass and water to drink in plenty, they did admirably, as all season their quarters were comfortable, but the great want was pasture, and, worse still, no water but what was carted, and this jumbled up, and not much of it. In such cases stock did not thrive, but it was altogether an exceptional season for such a moist county as ours. In Scotland they have been free from disease, but unfortunately not so in England, and the alarming thing is, our Government does not seem able to "spot" the source of infection and put an end to it. This is not as it should be, and wants immediate reform. *Clip of wool*—Some clips over the average, whilst others were under.

PERTSHIRE (Western District). *Wheat*—The yield of straw rather under an average, but of good quality and well got. The yield of grain was fully an average, both as regards quantity and quality; about 36 bushels; seed, 3 to $3\frac{1}{2}$ bushels. The area of wheat grown was rather less than usual. *Barley*—A short crop of straw, and consequently a lessened yield of grain, but as regards both the quality was of the best. The crop was well got; seed, $3\frac{1}{2}$ bushels; about 32 bushels. A less area of barley

than usually grown. *Oats*—A short crop, both on carse and dry field farms, but in both cases the quality of straw was excellent. The yield of grain is under an average, but the quality is much above the average for the district. Yield, 40 to 42 bushels on strong land, and 34 to 36 bushels on dry field farms; seed, 4 to 4½ bushels. *Harvest*—The prolonged drought of the past summer had a serious effect on the cereal as well as the other crops, with the result that harvest was commenced three to four weeks earlier than usual. In many cases the "harvest time" was the shortest on record. *Hay*—A fair crop on carse land, but on the dry field farms the quantity was very much under the average. The crop was well secured and is of good quality. Yield on carse land, 38 cwt., on dry field land 25 cwt. *Timothy-hay* on carse land, 40 cwt. *Meadow-hay*—Under an average crop, but of good quality. *Potatoes*—Above the average in bulk—7 to 8 tons per acre of first-rate quality for the district; free from disease. Ordinary varieties only grown in this district. *Turnips*—Under an average in weight—16 to 18 tons. Crop braided badly in some places, but recovered somewhat after thinning-time. There was some second sowing, but injury from insects was not prevalent. Weeds were easily dealt with, as the dry weather hastened their destruction. On many light land farms the crop was wellnigh a failure on account of the absence of rain. *Live Stock*—Pasture suffered from the drought, and on many dry field farms there was practically no pasture for stock except in the cases where there may have been pasture of a semi-permanent character. Stock in general did very badly, and cattle in many cases were sold in autumn for less money than they cost in spring; cattle and sheep free from disease. *Clip of wool*—Of good quality, and just about, or possibly rather over, the average in quantity.

PERTSHIRE (Eastern District). *Wheat*—The best crop of the season; bulky and good quality, both of grain and straw. Yield, about 40 bushels per acre; seed, 3 to 4 bushels per acre. *Barley*—A light crop, but good quality. Yield, about 32 bushels per acre; seed, 3 to 4 bushels. *Oats*—Very poor crop, and owing to the protracted drought it ripened prematurely; both grain and straw light. Yield, about 40 bushels; seed, 4 to 6 bushels. *Harvest*—About a fortnight earlier than usual. *Hay*—Light crop; about 30 cwt. per acre, but good quality and well secured. *Meadow-hay*—Very little grown. *Potatoes*—Fairly good crop considering the extremely dry season. Yield, 6 to 7 tons. No disease. *Turnips*—About two-thirds of an average yield; about 16 tons per acre. Braird very irregular and patchy; some second sowing required. Not more than usual injury by insects. Injury by weeds not more than usual. *Live Stock*—The early pastures up to 1st June were good, but after that date they suffered severely from drought till the end of the season, and in many cases were burnt up entirely. Stock throve better than any one could have expected; cattle and sheep free from disease. *Clip of wool*—Good average.

PERTSHIRE (Central District). *Wheat*—Very little grown. About 28 to 30 bushels; straw short. Both grain and straw of excellent quality; 4 to 5 bushels sown. *Barley*—A small crop on most land owing to excessively dry summer. Both grain and straw of excellent quality. Harvest early and without interruption. About 30 to 32 bushels; about 5 bushels sown. *Oats*—A very small crop on most land; grain of good quality, but on thin land both grain and straw was a light yield. Although both were of excellent quality, and were harvested very early without interruption, the average yield would not exceed 40 to 42 bushels; 5 to 7 bushels sown. *Harvest* was very early, and was proceeded with entirely

without interruption. Everything was secured quickly in the best possible condition. *Hay*—Ryegrass and clover-hay was also a small crop, but was well secured in all cases. It would not average more than 20 to 22 cwt. *Meadow-hay* was a very small crop, and on light land was hardly worth cutting. It was all got in good order, but would not average, on the high farms, where it is mostly grown, 20 cwt. *Potatoes*—The potato crop was a fairly good one, and would average 6 or 7 tons. There was little or no disease. No new varieties were planted to any extent, the principal varieties being "Langworthys" and "Up-to-Dates." *Turnips* were a very variable crop in this district, different fields varying very much on the same farm; on the whole they would be distinctly below the average, especially the "yellows." The average crop of the district would probably not exceed 12 to 15 tons. The crop braided very irregularly, and there was some second sowing, which was not much of a success. Not much damage by insects. Weeds were never better kept in check. *Live Stock*—The pastures were very bare and dry all season owing to the excessively dry summer. On thin lands they have never been worse burned than this year, but deeper land kept the grass surprisingly well. Stock thrived fairly well, but where heavily stocked did not put on flesh as well as usual; both cattle and sheep have been free from disease in this district. There was more than the usual loss in sheep stock from maggots, which on most hill farms were worse than they have ever been, even out to the very "tops," where they were practically unknown before. *Clip of wool*—The clip of wool was of good quality, and, owing to the good condition of sheep, would be decidedly above the average.

PERTSHIRE (Highland District). *Wheat*—No wheat sown. *Barley*—Area under barley less than in former years; crop up to a fair average; straw very good and very early ready for sickle; quality of grain in colour, also quantity, superior to last year, but the pickle not as plump as one would desire; 32 bushels, but average weight less per bushel; 5 bushels sown. *Oats*—Crop under the average in straw owing to dry season and want of moisture in June and July. Quantity of grain not up to average in natural weight, but quantity per acre up to average; 54 bushels; colour of grain everything to be desired; 6 bushels sown. *Harvest* a fortnight earlier than the average of years, and was general about 25th August, and completed in most places by the middle of September; even in the higher districts harvest finished on the 31st of the month. *Hay*—A very light crop throughout; about 20 cwt. Quality good, and well got. Clover very scarce, with no aftermath, all owing to the dry summer. *Meadow-hay*—Under an average crop, owing to the dry weather setting in early in June, and especially where eaten with sheep till end of May. All well got, and with much less expense. *Potatoes*—Equally as good a crop as last year, but with less ware and more seconds; 5½ tons. Good deal of disease in early varieties, showing in August about a third affected. No new varieties planted. *Turnip* crop about an average all over; 18 to 20 tons. Swedes barely so bulky as last year: 15 tons. Quality exceptionally good in both kinds. Crop braided very irregularly, more especially where late sown, and where dunged in the drill; very little second sowing required. No damage done by insects or fly. Crops very free from weeds owing to the good dry weather for tilling. *Live Stock*—Pastures early and good to end of June; dry weather having then set in they got very burned-up and bare, except in the glens, where they were very good. All kinds of stock did well throughout the summer, especially stores and cattle for fattening. Milk cows got nearly dried up in August, except where they were specially fed to give milk. Both

cattle and sheep free of disease. *Clip of wool*—Quality of wool very good, and over an average in weight. Flock-masters and graziers suffered heavy loss from maggots before and after being clipped, especially so on lands covered with bracken.

FORFARSHIRE (Western District). *Wheat*—A capital crop, much better than last year; 40 to 44 bushels of good quality grain, and plenty of straw; seed, 3 bushels drilled and 4 bushels broadcast. *Barley*—Much under average; 28 to 30 bushels; straw very short, especially later sowings; seed, 3 bushels drilled, $3\frac{1}{2}$ to 4 bushels broadcast. *Oats*—Also much below average; 40 to 42 bushels, but in some instances (on very light land) not a third of this quantity; straw short, but of good quality; seed greatly depending on variety; 3 to 5 bushels drilled, and 4 to 6 broadcast. *Harvest* very much earlier than usual, and the easiest managed in every way in the writer's recollection. *Hay*—A fairly good crop unless on the lightest land; 36 to 40 cwt. per acre, of good quality. *Meadow-hay*—Very little meadow-hay made in the district. *Potatoes*—The potato crop was quite as good as last year, and will average 7 to 8 tons per acre. Mostly raised in exceptionally dry weather, they looked well in the pits, and with practically no disease. "Date" varieties, more especially "Dalhousies," were bulkiest crop. *Turnips* a three-quarter crop, 16 to 18 tons; very little second sowing, although some long in brairding. No damage to speak of by insects or weeds, these both being very easily managed. *Live Stock*—Pastures extremely bare. Stock thrive well till middle of July, but after this did no good, and left nothing for grazing. No disease to speak of. *Clip of wool*—Wool clips in the lowlands, average; on hill grazings over average. Blackface wool being over average quality.

FORFARSHIRE (Eastern District). *Wheat*—42 bushels grain, and 30 cwt. straw; both of very excellent quality; 3 bushels seed when drilled in, 4 bushels seed when sown broadcast. *Barley*—36 bushels grain, and 18 cwt. straw; both of very excellent quality; 3 bushels seed when drilled in, $3\frac{1}{2}$ bushels seed when sown broadcast. *Oats*—50 bushels grain and 20 cwt. straw; grain perfect quality; straw somewhat over-ripened. Old potato-oat varieties, $3\frac{1}{2}$ bushels seed drilled, 4 broadcast; new rough-skinned varieties, 6 bushels drilled. *Harvest* commenced August 7, fully a fortnight earlier than usual, and the earliest since 1877, as far back as your reports records go. *Hay*—Crop deficient in quality; clover very poor; average weight 1 ton 5 cwt. *Meadow-hay*—Very little in the district. *Potatoes*—No disease. No new varieties in the locality. Weight 7 to 9 tons of perfectly sound stuff. *Turnips*—Crop brairded all right, but was taken early by drought, and never recovered to any extent. Weight 18 tons per acre, say 8 tons under last year's very big crop, and 5 tons under an average. No injury by insects. Summer too dry for weeds. *Live Stock*—There was practically no pasture after the 1st of July. Very little stock grazed last summer at all on account of want of grass; cattle and sheep free from disease. *Clip of wool*—A good clip of over an average quality. It might be stated that probably no district in Scotland, with the exception of the North of Fife, suffered so badly from the drought as Eastern Forfarshire, wheat being about the only crop which stood out.

ABERDEENSHIRE (Buchan District). *Wheat*—No wheat is grown. *Barley*—There was less than the average or usual area sown with bere or barley. The yield of barley was much above anticipation, considering the dry season. The quality was good and the weight was from 56 to 58

lb., and even more in some cases. The seed sown averages 4 bushels. *Oats*—Owing to the long-protracted drought of the summer the oat crop did not come up to the average bulk in straw, but the grain has turned out well and is above the average, much more than would have been anticipated from the appearance of the crop before harvesting. The weight of the corn is from 40 to 44 lb.; seed sown is about 6 bushels. The quality of both grain and straw is excellent, as the crop was secured in the best possible condition, and in most cases without receiving a shower. *Harvest*—The harvest began about the first of September, but earlier in some places. *Hay*—Ryegrass and clover for hay secured in excellent order, but the weight per acre is about 20 to 27 cwt. under the average. *Meadow-hay*—None grown in the district. *Potatoes*—The potato crop was a very good one, of superior quality and free from disease. *Turnips*—A most abundant crop last year has been followed this year by one of the shortest for a long time, and with some finger-and-toe disease. A considerable amount of resowing had to be done. It is difficult to state the weight, but an average of 10 to 16 tons may be taken. *Live Stock*—Pasture was allowed to grow at the beginning of the season owing to last year's large supply of turnips. Stock made fair progress owing to the dry season.

ABERDEENSHIRE (Formartine District). *Wheat*—None grown. *Barley*—Last year 30 bushels; this year 36 bushels, with a good average bulk of straw; bushel weight about 57 lb., being 2 lb. higher than last year. The quality is equal to the finest ever seen; seed 4 bushels. *Oats*—Last year 37 bushels, this year 40 bushels, with scarcely an average bulk of straw. The bushel weight is about 43 lb. and the quality of grain excellent; seed, 5 to 7 bushels. *Harvest* began 10 days earlier than usual. The weather during summer and harvest was very warm and dry, and the crop was secured in perfect condition. *Hay*—Crop about 27 cwt., or 3 cwt. less than last year; secured in perfect condition. *Meadow-hay*—None grown. *Potatoes*—This year 6½ tons of fine quality, *i.e.*, about the same quantity as last year. *Turnips* last year 22 tons; this year 11 tons. The weather was warm and dry, and the turnips did not braird well; a great amount of resowing was done where drought killed first braird. Not much damage by insects or weeds. *Live Stock*—Pastures not of average growth, quality rather too dry. Stock thrived fairly well, except where fields became too bare or burnt up; cattle and sheep free from disease.

ABERDEENSHIRE (Strathbogie District). *Wheat*—None grown. *Barley*—On account of a series of unfavourable and unremunerative prices for barley, the area under that cereal has been declining in recent years, with the result that last year the extent was probably the lowest for many years. The season being particularly dry and the heat intense, the crop was short of straw. The quantity of grain may be placed at 40 bushels, being above an average for the district, and the quality was excellent, several of the parcels weighing up to 57 lb. *Oats*—The prolonged drought and excessive heat told greatly on the oat-crop, and as a consequence the bulk of straw generally was very poor, the stackyards being the smallest since 1868. Fodder is remarkably scarce, and the most rigid economy is being practised in order that the stock during winter may be tided through even in a bare way. The crop is threshing better than expected, and may average fully five quarters of grain of excellent quality and heavy weight. *Harvest* operations began about ten days earlier than the usual period of commencing; and as the season was without a shower, work proceeded rapidly from the commencement till the finish, which was

accomplished in record time. Several farmers had the crop all secured and the stackyards finished within a month of the commencement of cutting. *Hay*—The hay crop was very disappointing as regards bulk, and may be placed at one-third below an average. There was a great deficiency in clover, hence the short weight per acre. The weather being ideal during the sowing season, the quality was of the finest ever produced in the district. *Meadow-hay*—There is no meadow-hay grown in Strathbogie. *Potatoes*—The potato crop was very variable in yield. On some farms where the soil suited the season there was an excellent return over an average in quantity, and far above an average in quality. Not a single complaint was heard of disease in the district. No new varieties planted. *Turnips*—The season told severely on the turnip crop, and it is generally considerably below an average yield. Up till the end of autumn, or so long as the dry weather lasted, there were numerous fields which promised badly, but after the rains came about the middle of October they made up wonderfully, and are much better than could have been expected. The crop is unfortunately light to cart, and on the whole perhaps only half of last year's yield. On heavy soils the plants were rather stiff in coming to the hoe, but when once they were established they came away all right, but rather open. There was very little resowing in the district. Being a dry year, the crops were not injured by weeds, to the same extent that they are in a wet season. *Live Stock*—Pastures during the early portion of the season were luxuriant, but the dry weather told upon them as the season advanced, with the result that grass became somewhat scarce. Complaints were rather numerous that, owing to the parched nature of the pastures, stock did not do so well as they usually do in a dry and warm season, the result being that conditioned cattle were housed at an earlier date than is usually the case. Cattle and sheep have been perfectly free of disease. *Clip of wool*—The clip of wool was over an average in quantity, and the quality was also better than usual.

BANFFSHIRE (Lower District). *Wheat*—Very little sown; what was, was a good crop, about 40 bushels per acre; 4 bushels sown; very good quality. *Barley*—About half less than usual sown; 4 bushels seed; threshed much better than last year; 36 to 40 bushels per acre, and very heavy; 56 to 59 lb., a fair quantity and excellent quality. *Oats*—Crop under the average; 36 to 40 bushels; 42 to 46 lb. per bushel; 6 bushels seed; excellent quality of straw, but very short owing to dry weather. *Harvest* earlier than usual, about 21st August. A good harvest, never a wet day, occupied under a month. *Hay*—Very poor crop as to quantity; quality fair, 1 to 1½ tons per acre; rye short, and very deficient in clover. *Potatoes*—An abundant crop, in most cases better than last year; 8 to 10 tons per acre, and of excellent quality. *Turnips*—About half a crop, and only fair quality; swedes 12 to 15 tons; yellows badly spoiled with disease; braird very bad; in a great many cases twice sowing, and in some cases three times owing to fly. Crops injured by fly when brairding. No injury by weeds. *Live Stock*—The pastures looked well at first, but the dry weather in June burned up the grass. Stock did not do well owing to scarcity of grass. Cattle and sheep have been fairly free from disease; a few cases of anthrax. *Clip of wool*—The clip of wool was of good quality and up to the average.

BANFFSHIRE (Upper District). *Wheat*—None grown. *Barley*—The acreage of barley has been much restricted now for two years, owing to former late seasons and low prices; the past season's crop yielded a fair average per acre on good soil, about 4 quarters, but the price com-

pensated very much, being from 33s. to 35s. *Oats*—On fairly good deep soils a most profitable crop, from 5 to 7 quarters, but on light dry shallow lands poor returns of 2 quarters to $3\frac{1}{2}$; however, oats altogether weighed well, in several instances 45 to 48 lb. *Harvest* began fully two weeks earlier than an average, coming on from the middle of August, and the weather being most favourable, crops were secured in first-class order—bere on our latest hillsides by the third week in September. *Hay*—Crop mostly light, as clover did not come up well owing to restricted rainfall; only on loamy deep soils was anything over 100 stones gathered. *Meadow-hay* is not much in evidence in this region. *Potatoes* are only grown for home requirements; they are of excellent quality, and not a trace of disease; “Up-to-Date,” “Maincrop,” “Fortyfold” are the common field varieties. *Turnip* sowing began under favourable conditions, but heavy rains at the 1st of June stiffened those then braiding, and these were slow of coming to the hoe; moderate rains after a little caused rapid growth in the plant stage, but too dry weather again later on left the crop under average. No damage to speak of by insects. The season being dry and sunny, crops were cultivated with great advantage, and fields have been cleared of weeds: that will show an improvement throughout the rotation. *Live Stock*—Pastures came out early, and stocks were on them closely from the start; by the end of June farmers dependent on rotation grasses had bare fields until aftermath came. Stock thrived pretty well, but grazing tenants fared badly, as cattle were at high figures in spring, and had to be got indoors for early enforced sales. Happily all kinds of stock have been immune from disease over these regions.

MORAYSHIRE. *Wheat*—Not a large extent grown; crop good; average, 41 bushels, being 1 bushel more than last year; straw, 50 cwt.; quality of both excellent; seed sown, from $3\frac{1}{2}$ to 4 bushels. *Barley*—A fair crop; average, 35 bushels, being 5 bushels per acre more than last year; straw, 37 cwt.; quality of both excellent; weight of grain, from 56 to 60 lb.; very little light grain; seed sown, from $3\frac{1}{2}$ to 4 bushels. *Oats*—A light crop of straw, especially after turnips; grain average, $4\frac{1}{2}$ bushels per acre, being $\frac{1}{2}$ bushel less than last year; straw, 37 cwt.; quality of both very good; seed sown, from 5 to 7 bushels. Owing to the very dry fine weather during harvest, the above crops were secured in first-class condition, hence both grain and straw are of excellent quality. *Harvest* began about 17th August and finished about 11th September, about three weeks earlier than last year. *Hay*—Grass and clover-hay averages $30\frac{1}{2}$ cwt., being $1\frac{1}{2}$ cwt. less than last year; quality fair; a large quantity being exposed to the rainy weather, and secured in very middling condition. *Meadow-hay* not much grown; under an average crop owing to the dry month of June; suffered a little in making with rainy weather. *Potatoes*—Crop averages $6\frac{1}{2}$ cwt. per acre, same as last year; quality good; no disease to speak of; a few new varieties planted with fair results. *Turnips*—Bad; average only 14 tons per acre, being $4\frac{1}{2}$ tons under last year's crop; the crop braided well; little or no second sowing; little or no damage by insects or weeds, but a good deal by finger-and-toe. No weeds unless on badly cultivated farms. *Live Stock*—Pastures did not stand out so well as last year; they were good until affected by drought in the month of June, and although they were improved by the rain in July, they never completely recovered. The stock did well, but latterly they failed to get as much as would satisfy them. No disease in the county. *Clip of wool*—Much about the same as last year both as to quantity and quality.

NAIRNSHIRE. *Wheat*—Very little grown, if any. *Barley*—About 4 quarters of good quality and weight; straw shorter than last season

owing to drought; 4 bushels per acre is about the seeding in this district. *Oats*—Owing to the brightness of the season, combined with drought, this crop is not seeding so well as barley; say 40 bushels of sound grain, small in size, and lots of lights; straw of good quality, but much less in bulk. *Harvest* a fortnight earlier than usual. *Hay* not nearly so heavy as last year, say 25 cwt. of good hay, with more ryegrass than clover in most cases. *Meadow-hay*—None cut about here. *Potatoes*—A full average crop of sound potatoes, say 7 tons; little if any disease was seen. I planted "Table-Talk" for the first time, and they did well; didn't hear of any other new varieties. *Turnips*—Swedes are a little below the average crop, say 18 tons; yellows were a small crop; being sown on poorer soil they were spoiled by the drought in October. In some cases they didn't braird well for want of rain, but came without second sowing. The latest were the best crops. In several places where the fifth shift is pursued—that is, two grasses—finger-and-toe was rampant. *Live Stock*—Pastures not to be compared with last year in quality or quantity. Cattle did fairly well, but sheep did not feed as they ought to, owing to want of bottom soil; cattle and sheep quite free from disease. *Clip of wool* quite up to the usual.

INVERNESS-SHIRE (Inverness District). *Wheat*—The amount sown is generally from 3 to 4 bushels, and luckily a great deal more ground was sown with wheat, as it was the crop of the season. *Barley*—The barley as a crop did not bulk so much as usual, but threshed out better than expected, and being secured in perfect order, a much greater quantity than usual went south; average yield per acre, I would say, was about 32 bushels. *Oats*—Very short in straw, but a fair yield per acre would be got. It was not a strong sample, and there was a great amount of light grain; quantity sown from 5 to 7 bushels; variety and ground had of course to be considered; yield, 40 to 44 bushels. *Harvest* started very early, and continued without a lost day. Indeed two of the short crops we had could have been secured in the time. *Hay* was a failure in almost every case—not half a crop. *Meadow-hay*—Very little grown. *Potatoes*—A much better return than anticipated, but the older varieties are most successful. *Turnips* also have done better than anticipated. The crop brairded first class, but the continued dry weather kept them for a long time at a standstill. It would be difficult to fix an average, although there are fields of swedes up to 30 tons per acre. *Weeds* same as last year. *Live Stock*—The pasture did not yield in many cases the half of a normal year. Stock did very well, but had to be very much supplemented with artificial feeding; cattle and sheep free from disease.

INVERNESS-SHIRE (Skye). *Wheat*—None grown. *Barley*—None grown. *Oats* were short and thin on light land, but where early sowing took place on good land they were fully an average; quantity of seed sown between 5 and 6 bushels. *Harvest* began about a week earlier than usual. *Hay*—Ryegrass was a very light crop owing to the dry season. *Meadow-hay* was a small crop except on deep damp land, where it was fully as good as last year. *Potatoes* were a light crop, and a lot of them undersized. Free from disease; no new varieties sown. *Turnips* are a good crop and very sound; owing to the dry weather there was some second sowing. No injury by insects or by weeds. *Live Stock*—Pastures during the season were of average growth and quality with last year; stock, especially sheep, thrived well; cattle and sheep free from disease. *Clip of wool*—An average clip.

INVERNESS-SHIRE (Lochaber). *Wheat*—None. *Barley*—None. *Oats*—4½ bushels under the average of last year per acre; straw ten per cent

under last year; seed sown, 6 bushels. *Harvest* began 16 days before last year. *Hay*—5 cwt. less than last year. *Meadow-hay*—Crop more than last year. *Potatoes*—8 cwt. more than last year; no disease. *Turnips*—Average of last year; braided well. Wire-worm common; Carrion weed troublesome. *Live Stock*—Pastures during the season not of average growth and quality with last year; stock thrived not so well as last year; cattle and sheep free from disease. *Clip of wool* better than last year.

ROSS-SHIRE (Dingwall and Munlochy). *Wheat*—More grown than last season; quality very fine, as season was hot; quantity, say 40 bushels; straw average; seed sown, 4 bushels. *Barley*—Crop average yield, 40 bushels; quantity of straw below average; quality of grain very fine; seed sown, 4 to 5 bushels. *Oats*—Quantity of grain above average, also quality; straw very fine; quantity, say 48 bushels; seed sown, 4 to 6 bushels. *Harvest* began on 7th August, some fourteen days earlier, and completed early, weather being favourable. *Hay*—Quantity, say 1½ tons; quality fine. *Potatoes*—Very little disease; no new varieties; yield, say 8 tons. *Turnips*—Crop braided well considering dry season, but some resowing was needed. Mildew was hurtful in many cases. Yellow varieties were a light crop, say 12 tons; swedes grew well later, and were full crop, say 25 to 35 tons. Not much injury by insects; no weeds. *Live Stock*—Pasture growth was affected by the drouthy season up to middle of October. Stock thrived well; cattle and sheep free from disease. *Clip of wool*—Average.

ROSS-SHIRE (Tain, Cromarty, and Invergordon District). *Wheat*—One of the best wheat crops ever seen in the district; yield from 40 to 56 bushels; quality and weight per bushel, owing to dry summer, is exceptionally good; 4 bushels per acre generally sown; straw average quantity. *Barley*—A much better threshing crop than that of last year, and as almost none of it was laid, quality and weight are over average. Yield from 32 bushels up to 46 on good land; average, say 36 bushels. A good many samples weigh 58 lb.; 3½ bushels sown. *Oats*—A good average crop, from 40 to 60 bushels, according to land on which it was grown; quality of both grain and straw is over average, but bulk of straw is less than usual; 4 to 5 bushels sown. *Harvest* was very early, beginning a fortnight earlier than usual. *Hay* was, as a rule, a light crop. Where it was not grazed in spring, yield would be about 1½ ton, but in most cases grazing reduced yield to 1¼ ton. *Meadow-hay*—None grown. *Potatoes*—A good crop, more than double that of last year; average yield, 9 to 10 tons. There was very little disease. Varieties mostly planted are "Dates," "Dalhousies," "Table-Talk," and "King Edward." Some "Presidents" were grown, and were a big crop. *Turnips*—Finger-and-toe was prevalent and very much reduced the average yield of the crop. Where sound the yield was good, up to 30 tons, but many fields were almost a total failure; crop braided irregularly, and a fair amount of second sowing was done. The dry weather had an adverse effect on the braird. Turnip-fly did some damage, otherwise there was no insect attack to speak of. Couch-grass and charlock and runch are the most common weeds, and the two latter showed very strongly in grain crops. Couch-grass was easily kept down as the weather was dry. *Live Stock*—Pastures were, as a rule, poor. On some of the strong clay land they grazed well, but on light land they were very much burnt up. Stock did not thrive as well as usual, the weather being too dry. Cattle have needed more house feeding when coming off the pasture, and the average weight of the lambs when slaughtered has been low. Cattle and sheep were healthy. It has been

one of the worst years known for maggots; in July and August they caused tremendous trouble and annoyance. *Clip of wool* was a good average.

SUTHERLANDSHIRE. *Wheat*—None sown. *Barley*—None sown. *Oats*—A fair crop, well harvested, and grain threshing out well; straw rather light. *Harvest*—About ten days earlier than usual time. *Hay*—Quality of hay much better than previous year, but quantity deficient; about $1\frac{1}{2}$ ton per imperial acre would be the average. *Meadow-hay*—Quantity less but quality better. The hot dry summer was much against this crop. *Potatoes*—The area of land under potatoes in this district is very limited. There was no disease, and the quality was excellent; "Champions" are the kind that turn out best, and are mostly planted. *Turnips*—Weight of turnip crop about 20 tons; quality very fair on high land latish sown, but on early sowing near the coast-line there was great complaints of finger-and-toe. *Live Stock*—On this land pastures last summer were much burned up. Deep mossy land stood the drought much better; on this kind of ground there was abundant grass. Stock thrived very well; cattle and sheep free from disease. *Clip of wool* over the average and quality excellent.

CAITHNESS-SHIRE. *Wheat*—None grown. *Barley*—There was a good crop of barley of about 34 bushels per acre, well matured; straw short. From 4 to 5 bushels of seed are generally sown. *Oats* had a good seed-bed, and came on very well. Showers came seasonably, but the dry summer lessened the straw, which is shorter than usual. Grain filled quickly and kept long soft, but eventually turned plump and full, and when well dressed weighed 43 to 45 lb., the average year reaching only 39 or 40. From $4\frac{1}{2}$ to 6 bushels of seed are generally sown; yield, 3 to 6 quarters. *Harvest* began about three weeks earlier than in average years. 1911 resembled 1868, when the crop was secured very early, and the straw was short. The weather was very favourable from first to last, and in some cases fields were got in without a shower—a rare experience for Caithness. *Hay*—The hay crop was light, $1\frac{1}{2}$ to $2\frac{1}{2}$ tons, but the clover was well developed, and the foggage or aftermath was generally luxuriant. *Meadow-hay* was less in weight and bulk than in wetter seasons. *Potatoes*—The potato crop has been the best for years as to quantity and quality. Various varieties have been tried—"British Queen," "Windsor Castle," &c., but the "Champion" is found to yield about 6 tons or more, and for "mealiness" and "flavour" holds its own on the table. Disease was late in appearing, and 1911 will be remembered as a good potato season. *Turnips*—Some turnips failed to germinate till rains came, and only half a crop, but of good quality, was got. Turnips laid down in wet condition "went" with "finger-and-toe" and other fungoid diseases, and became a dead loss. The first and the very last laid down yielded good crops of 15 to 20 tons, with specimens of single turnips—far apart—weighing 12-18 lb. "Daddy-longlegs" or "leather jacket" or "grub" did not do any serious damage; but the "sticked" turnips became a prey to the "fly." "Skellock" and "corn marigold" tend to "smother" the oat crop; thistles and coltsfoot are still rampant, and spreading thicker and farther. Deep ploughing in autumn, and ploughing instead of "grubbing," tends to cut roots of thistles when preparing land for turnips. *Live Stock*—Pastures—considering the rainfall was 4 inches less than the last ten years' average—suffered, and water for stock in pastures became a problem which in many cases had to be solved by carting water from a distance. The stock thrived fairly well. There are some instances of abortion, very disappointing and perplexing. "Piners" were few, and sheep-scab being exterminated through the frequent dippings, cattle and sheep have been

on the whole healthy and free from serious constitutional or contagious disease. *Clip of wool*—There was a good clip of good quality and of average weight. “Cheviot” fleeces were in demand.

ORKNEY. *Wheat*—None grown. *Bere*—A good crop; average yield about 30 bushels per acre, weighing 51 lb. per bushel; seed, $3\frac{1}{2}$ to $4\frac{1}{2}$ bushels. *Oats*—Part of the oats was sown early in April, and part only in the second week of May, but the summer was exceptionally fine and warm, with occasional showers, and all the crops were good. Straw was fully an average bulk, and grain was better than last year, being about 32 bushels, weighing 41 lb.; seed, 4 to 6 bushels. *Harvest* began about the 1st September, being nearly three weeks earlier than last year, and with fine weather the crops were secured in a short time in good condition. *Hay* was a good and abundant crop, and was secured in good condition. It was much better than last year, the average weight being about 25 cwt. per acre. *Potatoes* were a good crop of excellent quality, and rather better than last year, the weight being about 5 tons per acre. *Turnips* were a good crop, but somewhat diseased. The average weight was about 12 tons per acre, being rather better than last year. Insects and weeds—Very little damage was done by either. *Live Stock*—Pastures were good all summer, and the aftermath was exceptionally luxuriant. Stock thrived well, and were free from disease. *Clip of wool*—The clip was an average.

SHETLAND. *Wheat*—None grown. *Barley*—Very little grown here now. *Oats*—Above an average; best crop for years. *Harvest* began before the usual time—about three weeks earlier. *Hay* an extra heavy crop; can't say how many tons per acre. *Meadow-hay*—More productive. *Potatoes*—About the same as last year both in quantity and quality; disease in one or two districts commenced about the middle of July. *Turnips*—Can't say as to weight per acre; crop above an average; only one sowing. No injury by insects. Weeds same as usual, chickweed and docks. *Live Stock*—Pastures above an average; stock thrived excellently; cattle and sheep free from disease. *Clip of wool* fully above last year.

THE WEATHER OF SCOTLAND IN 1911.

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the Scottish Meteorological Society.

THIS report consists of (1) a general description of the weather over the Scottish area from month to month; (2) a selection of rainfall returns, in which each county in Scotland is represented by one or more stations. It is to be noted that all the temperature readings referred to are, unless otherwise stated, from thermometers exposed in the regulation “Stevenson Screen.”

JANUARY.

The first month of the year was a very mild one in all districts, though, as compared with recent years, January 1906
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was at least as mild, and January 1898 very much milder. The general mean was $39^{\circ}\cdot6$, or $2^{\circ}\cdot3$ above the normal. There was a sharp touch of cold about 4th, but, generally speaking, conditions during the first two weeks were about the average, whilst during the third week, and still more during the fourth, the weather was extremely mild. On 31st there was a sudden change, and temperature fell rapidly. The highest reading of the month was 56° at Tillypronie on 18th, and the lowest 16° at Balmoral on 4th and at West Linton on 31st.

As regards rainfall, here and there, in north and west, amounts were equal to the normal, but in most districts the month was an extremely dry one—the driest of the year at Edinburgh, Dundee, and elsewhere. Many stations in the east had aggregates of less than 1 inch, and at Nairn the month was the driest January since 1889, though very generally within the area of greatest deficiency slightly lower rainfalls occurred in 1907, 1906, and 1905. The barometer stood almost continuously at a very high level, but there were rapid fluctuations of pressure about 5th, 10th, and 24th; and at these dates heavy falls occurred in west and south—as much as $2\cdot34$ inches at Greenock on 10th, or about thrice the rainfall at Edinburgh for the entire month. Except around these dates falls were as a rule unimportant, and in most districts there were many rainless days.

A violent westerly gale was general from 10th to 12th, with snow and sleet in districts, whilst gales or strong winds were more or less general on eastern and northern coasts about 1st, 5th, and 15th.

Thunderstorms occurred in the north on 10th, and in Orkney on 9th and 15th.

Sunshine amounts differed but little from the normal.

FEBRUARY.

The opening days of the month were decidedly cold, and the first half of it generally was characterised by low or moderate temperatures. The latter half, however, was extremely mild; in most districts the third week was at least 6° or 8° warmer than the first, and the general mean for Scotland, $39^{\circ}\cdot0$, was $0^{\circ}\cdot8$ above the normal. A reading in the screen of 11° was recorded at Balmoral on 2nd and 11th, and a thermometer on grass fell to 8° at that place on both these days. The highest reading recorded was 59° —at Crathes on 16th, at Dalkeith on 18th, and at Greenock on 22nd. During the first half of the month the barometer was continuously high, whilst the mild weather later coincided with a period of very rapid pressure fluctuations with some very low readings.

A wide variety of conditions was experienced as regards rainfall. From Aberdeen to Fifeshire and in the Border counties there was again a shortage, but over a great part of the country the month was a very wet one—the wettest of the year at Fort William, Glasgow, and elsewhere. As a rule, however, it was less wet than February 1903, though at Poltalloch it was wetter than any February in a record going back to 1866. The first eight days or so were practically rainless, and almost the entire rainfall of the month was registered between 12th and 25th. On 17th one of the severest rainstorms of the year affected a wide area, many stations recording more than 2 inches on that day. On 21st and 22nd there were again some very heavy falls—more than 3 inches at Glenquoich on the former day. At Aberdeen, on the other hand, no day had as much as one-quarter of an inch.

The heavy rains of 17th were accompanied by destructive flooding in some western districts, and south-westerly gales of considerable violence were experienced at that time, and also on 22nd or 23rd. Generally speaking, wind force was high from about 15th onwards. Snow or sleet occurred at times early in the month, though not to an important extent.

A thunderstorm was somewhat widely experienced on 22nd.

Dense land fog occurred during the first two or three days, and much fog in the Firth of Forth from 1st to 12th.

Eastern districts were much sunnier than western.

MARCH.

The weather during March was at first of a mild south-westerly type, but from about 13th onwards low day temperatures were the accompaniment of persistent winds from east or north-east, and in many districts the last week of the month was fully 4° colder than the first. The general mean of 39°·7 was practically equal to the normal. At Edinburgh, the month, as judged by its mean temperature, was colder than any of the three preceding ones, and on no day after 3rd did the thermometer reach 50°, whilst on several days it failed to reach 40°. The lowest reading recorded was 16° at Leadhills on 7th, and the maximum of 58° occurred at Logie Coldstone on 2nd, at Fortrose on 12th, and at Oban and Ardtornish on 30th.

In most western and southern districts the month was the driest of the year. At Dumfries no day after the 3rd had as much as one-tenth of an inch of rain, and a March as dry had been experienced there during the preceding fifty years only in 1900. A number of scattered stations had aggregates of less than 1 inch, and there was a remarkable uniformity of distribution, a large part of the country having from 1 to 2 inches. There

were everywhere many rainless, or practically rainless, days; but rather heavy falls occurred in many districts on 1st, and moderate falls in west and north-west on several days before the 12th.

Strong south-westerly winds were experienced at the beginning of the month, whilst during the third week there were several falls of hail and sleet.

Kirkwall was the only station to report a thunderstorm—on the evening of 1st.

Practically no fog occurred, and the prevailing easterly winds were associated with rather cloudy skies on the east coast, but with very sunny weather in the west. Thus Oban had an aggregate of 192 hours of bright sunshine, but Edinburgh only 97 hours.

APRIL.

The cold easterly to north-easterly type of weather which had characterised the latter part of March continued during the first ten days or so of April, and was followed by much milder conditions, with winds as a rule from south-west. The general mean of $43^{\circ}\cdot9$ was $0^{\circ}\cdot2$ below the normal, though a considerable number of stations had a slight temperature excess. Early in the month the days were unusually cold, though warmer in Scotland than in the south of England. The extreme readings recorded were 67° at Smeaton on 22nd, and 12° at Leadhills on 6th.

Until about 14th the barometer was very steady and stood at a high level, as it had done during the latter part of March, and until that date there was a continuance of the dry conditions which had marked the preceding month. Thereafter, however, there were considerable fluctuations of pressure, and decidedly wet weather prevailed in all except eastern districts. The distribution finally, relatively to the normal, resembled that in February, with a decided shortage in the east and an excess elsewhere. At Inveraray the aggregate was twice the normal, and at many places the excess was more than 50 per cent. During the third week there were here and there a few heavy falls—more than 2 inches at Glenquoich on 21st. Within the dry eastern area Dundee had falls exceeding one-tenth of an inch on 24th and 25th only, about half of the month's small total being accounted for on these two days.

During the first week there were falls of snow and hail, and during the third week the weather was at times stormy.

Thunder was reported at Balmoral on 18th, at Kingussie on 19th, at Poltalloch on 21st, at Fort William on 24th, and near Dumfries on 29th.

Bright sunshine was decidedly below the average, and to-

wards the north-west the amounts were much below those recorded in March.

Fog in moderate amounts around the northern coasts between 21st and 25th.

MAY.

The month of May was conspicuously mild, and during the last fifty years a milder May has been experienced in Scotland only in 1889 and 1896. At a number of stations the mean temperature for the month showed an excess of more than 4° , and the general mean was $52^{\circ}\cdot 1$, or $3^{\circ}\cdot 1$ above the normal. The first few days were somewhat cold, but thereafter temperature was continuously above the average except for a brief break with northerly winds about 20th; and during the last few days the thermometer, especially in western districts, reached an unusually high level for the time of the year. Fort William and Balmoral reached 83° on 29th, whilst the minimum of 27° occurred at Stronvar on 1st and at Eskdalemuir on 6th.

As regards rainfall, the month was one of very irregular distribution, an excess in most western and some southern and northern districts being balanced by a decided shortage in east and south-east and here and there towards the north. Fort William, for example, had an excess of about 60 per cent, but Dundee and Perth a shortage of that amount. On Speyside, here and there in the east, and on the Borders, the month was the driest of the year. Almost the entire rainfall was, in all except north-western districts, accounted for during the first half of the month, and the latter half was rainless, or all but so, in many districts, this fresh spell of drought lasting until about the middle of June. Some heavy falls occurred during the opening days—about $2\frac{1}{2}$ inches at Leadhills and Ardvorlich on 3rd, and also in many districts on 13th and 14th.

Southerly winds were strong at times during the first week or so.

Between 12th and 14th thunderstorms occurred in many districts, and on 13th a heavy rainfall caused serious damage in the Luce valley. Thunder here and there at the end of the month also.

The month was very sunny—in general, the sunniest May since 1900, though at Stornoway May 1910 was at least as sunny.

JUNE.

The month exhibited a wide range of conditions. There was at first a continuance of the warm weather for which May had been remarkable, but about the middle of the month winds from north and north-west caused a considerable fall of temperature,

and a partial recovery was followed by cold weather during the last week. Glencarron had for the week ending June 3rd a mean temperature of $61^{\circ}7$ (or $12^{\circ}2$ above the normal), but for that ending July 1st one of only $48^{\circ}8$ (or $4^{\circ}6$ below the normal). The general mean for the month was $54^{\circ}9$, being exactly the normal. Lowest readings occurred between 14th and 16th, and at Carrbridge on 15th a reading of 25° ,—the lowest ever recorded in Scotland in June,—was accompanied by one as low as 17° from a thermometer exposed on the grass. On 7th Colinsburgh reached 85° .

Relatively to the normal the rainfall aggregates of the month showed a wide variety of conditions. At Stornoway, for example, it was the driest month of the year, and in Forfarshire there was a continuance of the drought which had persisted there since the beginning of the year. On the other hand, in south and south-east the totals greatly exceeded the normal, though this was due entirely to unsettled conditions from about 16th to 24th. Earlier in the month practically rainless weather was experienced. Severe rainstorms occurred in west and south on 17th, and in north-west and west on 21st. On 24th extremely heavy falls were experienced in north, north-east, and south-east—more than 3 inches at Duns. On that day, however, Forfarshire received quite nominal falls, and at Dundee no day during the month had as much as one-quarter of an inch of rain.

The heavy rains of 24th were the accompaniment of a gale from north-east and east, and wind force was high for a day or two about that time. About the middle of the month slight falls of snow occurred on the northern mountains, with hail at lower levels.

Thunderstorms were experienced at a few wide-spread stations on 1st, and were very general between 17th and 19th.

The first half of the month, and especially the first week, was extremely sunny.

Fogs prevailed around our northern coasts on 8th and 9th, and in east and north from 18th to 20th.

JULY.

The month, with a general mean of $59^{\circ}0$, or $1^{\circ}7$ above the normal, was on the whole the warmest July since 1901. The extreme range of temperature was very large, and the outstanding feature of the month was the remarkably warm weather experienced during the second week. For two or three days about 12th very high readings occurred, and the shade maximum of 90° at Perth on 12th has been equalled in Scotland only thrice in July since observations were organised

more than fifty years ago—in 1876, 1901, and 1908. During the third week conditions were about the normal, and thereafter there was a moderate temperature excess. The lowest reading reported was 32° at Balmoral on 20th.

The average level of the barometer was higher than in any July during the preceding fifty years, except in 1885, and such conditions were accompanied by a very low rainfall in many districts. Here and there in the south-east the month was the driest of the year, with several aggregates of less than 1 inch, and in east and south generally a great part of the month was rainless, with the greater part of the aggregate accounted for on one or two days of moderately heavy falls. Towards the north-west, however, many places had decidedly high rainfalls, as a result of rather wet weather during the first week and some heavy falls during the latter part of the month. At Stornoway there was an excess of as much as 75 per cent, and the 24th, with about 1 inch, was there the wettest day of the year. In the very dry area, Dundee and Marchmont had no fall of as much as a quarter of an inch on any day.

Thunderstorms occurred at Gordon Castle and elsewhere on 18th; at some western stations and in Fifeshire on 21st; and very widely on 29th or 30th.

The sunshine aggregates for the month, especially towards the north-east, were much above the normal, largely due to brilliant weather during the second week. At Aberdeen the month was the sunniest July for at least thirty years.

AUGUST.

Except in the extreme north, the month was a conspicuously warm one, and considering Scotland as a whole, a warmer August has been experienced during the last fifty years only in 1899, though in some districts August 1893 was at least as warm. The general mean was $59^{\circ}4$, or $2^{\circ}8$ above the normal, and the day temperatures especially were high. During the first half of the month temperature was at a continuously high level, and it remained so in southern districts until near the close, though elsewhere there were moderate fluctuations. The extreme readings reported were 88° at Colmonell on 13th, and 35° at Balmoral and at Logie Coldstone on 24th.

As regards rainfall, the month brought no break in the dry conditions which had now for many weeks persisted in eastern districts. Many stations had aggregates of less than 1 inch; wide areas less than half their average rainfall for August; and Gordon Castle, Arbroath, and Colinsburgh only about one-fifth of the normal. At Nairn and elsewhere the month was the driest of the year, and, considered generally, it was the

driest August since 1899. In many districts there was a practically unbroken drought from 7th to 23rd, whilst from 24th conditions were quite unsettled, with a heavy rainstorm in west and south on the 31st, with falls of more than 2 inches at many places, and more than 3 inches here and there in the West Highlands. Kinlochquoich on that day registered almost four times as much rain as fell at Nairn during the entire month.

The rainstorm of 31st was the accompaniment of a south-westerly gale.

Thunderstorms occurred at times—one of some intensity along the fringe of the East Coast on 9th.

Large amounts of sunshine were experienced.

SEPTEMBER.

Early in the month there was a continuance of the warm weather which had been experienced with inconsiderable interruptions for several weeks, but after 11th conditions were irregular, and with winds from some northerly point low night readings occurred on 21st and 22nd, and extremely cold days at the end of the month. The general mean of $52^{\circ}8$ agreed with the normal. The extremes reported were 79° at Crathes on 7th, and 24° at West Linton on 22nd.

The month was again an extremely dry one,—the driest of the year in Aberdeenshire,—but some north-western stations approached or slightly exceeded their normal rainfalls. At Balmoral the total for the month was less than half an inch, and in the Central Highlands generally the rainfall was quite insignificant. At Dumfries the month was practically rainless until after 18th, and in many districts the drought was broken during that period only about 8th or 11th. Later, conditions became somewhat unsettled, with rather heavy falls towards the north-west about 19th and 26th, and towards the south-east on 29th, on which day fully half the month's aggregate was registered at Edinburgh and elsewhere.

During the last week of the month the weather was at times stormy, with hail in places, and falls of snow on the hills in many districts. On 30th a gale from N. and N.-W. was experienced in the North Sea.

Thunder in Shetland on 11th, and at some southern stations on that day.

Except in the extreme north, the month was decidedly sunny.

OCTOBER.

Whilst a considerable number of the individual stations differed but little from the average, the general mean of $45^{\circ}5$ was $1^{\circ}1$

below the normal. Roughly speaking, with frequent winds from the north, temperature was on the whole below the average, except during the third week, when, with winds from a southerly point, there was in most districts a well-defined excess. In the north, however, temperature was continuously low. Towards the end of the month considerable fluctuations took place, and at a few stations both the highest and lowest readings of the month occurred on the same day, very low readings early on the 29th being followed by a rapid recovery of temperature. The actual extremes were 66° at Colmonell on 17th, and 15° at Balmoral on 29th.

As regards rainfall, the month fell into two distinct parts. At Dumfries no rain fell until 18th, and in many districts, except for moderate falls on 2nd, the month was practically rainless until after that date. There then set in an extremely unsettled type of conditions which persisted with only one or two interruptions until the end of the year. Considerable falls occurred in South Ayrshire on 21st and in Aberdeenshire on 23rd, whilst on 29th a violent south-westerly gale was accompanied by extremely heavy rains. In the south and south-west of Scotland, and here and there in the west, that day was much the wettest of the year, with more than 3 inches at Carsphairn, and more than 2 inches at widely scattered stations such as Langholm, Dalbeattie, Greenock, Stronvar, and Ballachulish. At some eastern stations only small amounts were recorded on 29th, though somewhat heavy falls on the following day. The wet weather with which the month ended did not, however, counterbalance the earlier drought, and over Scotland generally aggregates were below the normal, though here and there, as at Aberdeen and Edinburgh, fully the normal amount was experienced.

Wintry weather occurred on several days towards the close of the month, with snow in the north and on the Borders. On 29th a violent south-westerly gale was everywhere experienced, and the heavy rains which accompanied it caused flooding in many districts.

A thunderstorm on 30th in some western and southern districts, and at West Linton.

Sunshine amounts were at many places below the normal.

NOVEMBER.

In north and north-west there was a decided temperature deficiency, but elsewhere a considerable number of stations had a slight excess, and the general mean of $40^{\circ}5$ was $0^{\circ}4$ below the normal. In general, variations were not of a striking character. Rather high day readings occurred about 5th, and round the middle of the month temperature was above the

average except in northern districts. From 9th to 11th and about 21st there were brief visitations of frost, and during the latter part of the month, with northerly and easterly winds, decidedly cold weather was experienced. The extreme temperatures were 58° at Helensburgh on 14th and 18° at Leadhills on 21st.

For the first time during the year the average height of the barometer was much below the normal. Until about 18th conditions were of a very unsettled south-westerly type, and the month was in most districts a decidedly wet one—the wettest of the year in the north, and in Mid-Lothian and the south-eastern counties. In the extreme south-west, however, there was a slight shortage. During the first week rain was almost continuous in some districts, and Stronvar had as many as five days during that period with falls of 1 inch or more, whilst at Glenquoich 5½ inches fell between 3rd and 5th. For several days around the middle of the month much rain was again experienced—fully 1 inch at Poltalloch on 14th and at Gordon Castle and Glencarron on 15th; about 1½ inch at Nairn and Fort Augustus on 16th; and on 17th more than 1½ inch at Colinsburgh, and fully 1 inch at Balmoral, Arbroath, and Marchmont. At Nairn the aggregate fall for 15th and 16th was about 2½ inches, or more than the normal amount for the whole of November. From 20th onwards there were many fine days, with moderately heavy falls in north-east and south-east on 21st, and here and there about 27th. By the end of the month, Kingussie, Fort Augustus, Tillypronie, and Gordon Castle had fully twice their average rainfalls; whilst at Nairn, where the aggregate was two and a half times the normal, the month was the wettest November on record.

From 3rd to 5th very stormy weather was experienced. On 5th considerable damage was done by a strong south-westerly gale of a peculiarly squally character, and in districts the combination of heavy rainfall and unusually high tides caused destructive flooding. Later, conditions were at times very unsettled, with snowstorms in the north.

Thunderstorms occurred from 1st to 5th, except in eastern districts.

Sunshine aggregates were above the normal in the west, at Stornoway greatly so, but deficient at Edinburgh and Aberdeen.

DECEMBER.

The year ended as it had begun, with a very mild month. Temperature was at first somewhat below the normal, but from 10th onwards, with winds persistently from some southerly

point, almost continuously above. The third week was unusually mild, with a mean temperature of from 4° to 6° above the average, and in several districts the weather at that time was the mildest experienced since the middle of October. The actual extremes were 58° at Fort Augustus on 18th and 21° at Balmoral on 8th. On December 31st a mild south-westerly type of weather still prevailed.

As in November, pressure was extremely low, and with conditions almost continuously of an unsettled character the month was in general a very wet one, though in some northern districts there was a slight shortage, and at Edinburgh just about the average amount. In many districts the month was the wettest December for ten or fifteen years, and at Poltalloch it was the wettest for at least forty years, rain falling there and at other western stations on every day of the month. Several stations had aggregates of more than 10 inches, Ardtornish $16\frac{1}{2}$ inches, and Loan, near Glenquoich, as much as $21\frac{1}{2}$ inches. Poltalloch, Colmonell, and Cargen had twice, and Kingussie two and a half times, the average. At the other extreme Fortrose had only 1.70 inch. In the south of Scotland and elsewhere the month was the wettest of the year. Falls of 1 inch or over occurred at Stronvar and Leadhills on 2nd; at Greenock and other western stations on 6th and 8th; in the south on 10th; here and there on 18th; and at Crieff on 23rd. At Crathes on 15th as much as 2.03 inches was registered. On the other hand, in north and south-east there were many rainless days; and at Nairn there were only three days, and at Edinburgh only two, with as much as one-quarter of an inch.

As already stated, the month was remarkable for its mildness. The only touch of generally wintry weather occurred about 9th, and snowfalls were unimportant except on one or two days in the north. Wind force was in general high, and moderate gales were rather frequent at outlying places, though there were many sheltered districts in which none occurred.

A thunderstorm on 17th at Crathes, Stronvar, and in the west.

Sunshine aggregates as a rule differed little from the normal, but were above the average round the Moray Firth and in Orkney.

General Note.

The outstanding features of the year were the high level at which the barometer stood for long periods during the first ten months; the large amount of mild or warm weather experienced; and the remarkable rainfall shortage in some eastern districts. At Dundee, the year, with an aggregate rainfall

of only 17·08 inches, was not only the driest experienced there for at least fifty years, but very much the driest, with a deficiency of as much as 40 per cent. Comparing various districts with the normal, the generalisation may be made that the rainfall of 1911 was deficient in the north and east of Scotland, with a remarkable shortage in Forfarshire, the eastern fringe of Perthshire, and Fifeshire. In Mid-Lothian the western limit of the area of deficiency was soon reached, and, roughly speaking, the whole of Scotland to the west of a line running through Invergarry, Crieff, West Linton, Biggar, and Langholm, had fully the normal rainfall, with an excess of more than 10 per cent at some widely scattered places such as Glenquoich, Poltalloch, Greenock, Paisley, and Cargen. On the Ayrshire coast and in the extreme south-west divergences from the normal one way or another were unimportant.

RAINFALL RECORDS FOR 1911 IN INCHES.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Shetland—Lerwick	5.70	4.34	2.81	3.00	1.98	2.70	1.73	3.11	3.25	1.53	5.16	7.24	42.80
Orkney—Deerness	8.25	3.0	2.08	2.78	2.15	2.10	2.01	2.88	2.75	2.19	4.64	4.19	34.02
Caithness—Wick	1.89	2.75	1.77	1.76	2.02	3.19	2.44	1.23	2.33	1.72	3.30	2.98	27.38
Sutherland—Dunrobin	2.14	2.87	2.01	2.50	2.29	1.04	2.22	.78	1.56	1.86	4.37	2.71	26.35
Bettyhill	1.86	1.93	3.24	2.46	1.43	2.83	2.31	1.75	3.86	3.15	4.61	3.22	33.15
Ross and Cromarty—													
Fortrose	.84	2.58	1.13	1.55	2.21	2.48	1.61	.89	1.24	2.71	4.80	1.70	23.72
Strathpaffer	1.40	4.77	1.87	2.33	.97	1.49	1.84	.97	1.86	1.76	4.38	2.66	26.30
Glencarron	8.39	12.99	4.72	7.04	3.93	5.45	7.44	5.57	9.64	3.20	9.02	10.18	87.57
Stornoway	3.65	5.16	3.17	4.32	2.63	1.70	5.29	3.92	3.60	3.40	5.72	5.74	48.30
Inverness—Inverness	1.18	3.52	1.72	1.55	1.35	1.46	1.45	1.27	1.78	2.29	5.59	2.30	25.46
Kingussie	1.61	4.47	2.12	1.61	.96	1.68	1.39	1.61	1.18	2.25	6.15	3.34	28.27
Drumnadrochit	1.83	5.31	2.65	2.15	1.19	3.49	1.24	1.60	2.20	2.20	7.92	3.01	35.29
Knochoquoich	11.17	17.12	7.51	11.91	6.46	6.20	7.38	10.26	11.08	7.64	15.48	16.53	128.83
Fort William	7.04	12.45	4.58	6.53	6.05	3.20	5.24	7.15	6.75	3.84	11.25	10.14	84.91
Nairn—Nairn (Delnies)	1.04	3.19	1.24	1.99	2.19	2.89	2.42	.80	1.41	2.43	5.67	1.98	27.25
Elgin—Gordon Castle	1.10	1.99	1.17	1.63	2.33	2.08	3.56	.76	1.17	2.20	5.68	3.22	26.98
Banff—Craigellachie	1.89	2.27	2.23	1.30	1.35	3.18	2.69	.86	.91	2.97	5.53	3.22	28.40
Aberdeen—New Deer	1.17	2.35	1.30	1.55	2.55	2.20	2.82	1.32	1.48	2.89	4.78	5.63	30.99
Ellon	1.39	2.13	1.74	1.66	2.08	2.50	1.74	1.55	1.10	2.58	4.94	5.50	28.91
Aberdeen (King's Coll.)	1.43	1.07	1.74	1.32	2.72	2.37	1.50	1.12	1.02	3.13	4.68	5.43	27.58
Balmoral	1.88	2.00	2.07	2.42	1.84	1.26	1.23	.92	4.2	2.63	6.24	7.01	29.92
Kincairdine—The Burn	1.50	1.45	2.16	1.89	1.60	1.74	1.93	1.51	1.31	2.73	4.42	7.53	29.77
Forfar—Montrose	1.31	.79	1.22	1.50	.67	1.25	1.11	.91	1.00	2.26	3.66	5.19	20.87
Dundee	.62	1.10	1.14	.78	.81	.88	1.14	1.13	.91	1.57	2.82	4.38	17.08
Forfar	1.40	1.18	1.42	.94	1.27	.65	1.26	1.35	.77	1.94	3.89	6.35	22.42
Pearsie	1.13	2.03	1.78	1.94	2.27	2.11	1.80	2.15	1.36	2.72	4.75	7.27	31.31
Perth—Perth	.49	2.03	.87	.90	.92	1.56	1.63	1.31	1.05	1.92	3.75	4.02	20.45
Crieff	1.26	4.17	1.11	2.10	1.68	2.11	2.35	2.43	1.17	3.48	6.93	6.76	35.55
Stronvar	5.15	12.41	2.59	6.19	5.53	4.74	3.62	7.12	2.60	5.15	11.26	14.24	80.60
Dounie	2.41	5.86	1.71	2.14	1.70	2.11	2.61	2.51	1.93	2.05	5.31	5.62	35.96
Aberfoyle	4.80	10.50	2.30	3.80	3.85	3.60	3.55	6.05	3.70	5.50	9.35	11.75	68.75
Fife—St Andrews	1.09	1.54	.75	.74	1.04	.86	1.04	.85	.75	1.86	3.73	4.70	18.95
Kinross—Loch Leven	1.62	4.63	2.18	1.73	1.29	2.19	1.50	.82	2.01	3.06	6.15	4.76	31.89
Clackmannan—Alloa	1.03	3.86	1.82	1.42	.94	1.34	2.13	1.06	1.40	2.73	4.38	3.37	25.48
Argyll—													
Lochbuie (Mull)	10.24	13.78	3.68	7.55	5.23	4.59	8.08	7.00	6.74	5.09	9.54	13.85	94.85
Oban	5.10	7.75	1.84	4.79	3.85	2.84	4.44	4.61	3.97	3.02	6.59	9.26	58.06
Dalmally	7.93	13.08	3.43	6.55	3.62	3.63	6.03	5.79	3.71	4.85	10.55	12.45	81.62
Inveraray	7.48	12.43	4.85	7.28	4.96	3.91	5.64	7.96	3.84	4.50	10.37	12.41	83.62
Campbeltown	3.44	5.59	1.48	3.06	2.90	2.23	3.50	2.56	3.52	4.54	6.03	9.43	48.28
Bute—Rothesay	3.88	7.53	1.77	3.06	3.59	2.77	4.24	4.44	3.00	4.34	6.83	9.05	55.40
Stirling—													
Buchlyvie	5.22	8.68	2.38	3.47	3.58	3.07	3.13	4.09	2.43	3.40	7.16	6.64	53.25
Falkirk	2.56	6.12	2.45	2.28	1.29	1.45	2.26	2.59	1.50	3.79	5.70	4.09	36.08
Dumbarton—Dumbarton	3.26	6.63	1.16	2.70	2.30	3.53	2.89	3.90	1.70	3.99	6.92	8.42	47.49
Renfrew—Greenock	7.29	10.62	2.08	4.71	3.66	3.85	3.91	6.05	2.74	4.97	7.87	10.92	68.87
Paisley	3.60	7.72	1.61	3.18	2.77	3.35	2.47	3.80	1.65	3.85	6.70	7.36	47.56
Ayr—													
Kilmarnock Ag. Col.	2.89	6.18	1.41	2.68	2.35	2.09	2.47	2.53	2.02	2.69	4.08	4.62	36.01
Ayr (Doonholm)	4.61	7.08	1.39	4.43	2.71	3.06	2.63	2.25	3.11	4.42	5.63	6.17	47.49
Maybole (Knockdon)	3.15	5.77	1.38	3.85	2.67	3.13	2.35	2.50	2.52	3.96	5.00	5.87	42.15
Pinnore	3.42	6.29	1.33	4.65	2.62	3.62	3.00	2.31	2.49	5.01	5.05	11.75	51.54
Lanark—													
Glasgow (Observatory)	2.13	6.15	1.16	2.85	1.99	2.21	2.18	2.15	1.72	3.23	5.01	5.47	36.25
Airdrie	2.25	5.40	1.56	2.15	1.26	1.66	2.70	2.14	1.73	3.22	5.22	3.71	33.00
Lamington	2.78	4.50	2.82	5.08	2.01	3.16	1.16	1.78	2.34	3.39	5.56	7.60	43.08
Dungavel	4.79	9.59	2.36	2.82	3.17	3.08	3.08	2.51	2.18	4.98	7.10	7.24	53.25
Linlithgow—Boghead	3.10	5.79	2.07	2.50	1.97	2.69	1.81	2.06	1.70	3.60	6.89	3.49	37.67
Mid-Lothian—													
Edinburgh (University)	.86	1.99	1.56	1.15	1.17	2.56	1.11	1.17	1.33	2.82	4.63	2.07	22.42
Glencorse Reservoir	1.05	3.60	2.30	2.41	1.47	4.28	1.33	2.02	1.71	4.80	7.17	3.61	36.65
Haddington—													
North Berwick	.98	1.18	1.72	1.33	.84	2.34	1.19	1.28	1.09	2.47	3.82	2.68	21.12
Whittingehame	.85	.96	2.32	1.08	.90	3.26	1.17	.87	1.17	2.96	4.07	3.36	22.95
Berwick—Marchmont	1.40	1.90	2.53	1.74	.86	5.11	.89	1.54	1.49	4.02	4.57	4.74	31.69
Peebles—Peebles	1.84	4.04	3.51	3.38	2.06	3.16	.99	.59	1.29	3.24	5.01	5.22	34.33
Selkirk—Clovenfords	1.13	2.47	2.87	2.48	.98	2.29	.78	.99	1.06	2.57	4.65	4.41	26.85
Roxburgh—St Boswells	1.00	1.88	2.18	1.96	.67	3.05	.89	1.21	1.82	2.53	3.81	4.40	24.80
Branxholme	1.60	2.75	2.43	3.74	1.45	2.93	.91	2.18	1.64	3.25	4.72	5.45	33.06
Dumfries—Dumfries	1.66	4.10	.92	3.74	2.67	3.39	1.25	2.84	1.51	2.94	6.15	7.57	37.84
Drumlanrig	2.72	6.22	1.69	5.10	2.58	3.74	1.83	3.32	1.96	4.89	5.96	9.62	49.69
Moffat (Craigielands)	3.43	6.60	2.14	5.76	4.18	3.21	2.40	2.39	2.61	4.87	6.72	10.78	54.59
Langholm (Ewes School)	3.13	7.93	2.41	4.63	3.14	3.32	1.91	4.20	2.81	4.56	6.73	8.71	53.48
Kirkcudbright—Gargen	2.54	5.42	.85	.61	4.16	4.24	1.66	3.47	1.95	3.79	6.92	10.25	49.86
Dalbeattie (Kirkennan)	2.98	5.81	1.98	4.22	4.20	2.96	2.62	2.91	2.34	4.30	7.28	9.06	50.04
Dairy (Old Garroch)	5.21	9.25	2.26	6.11	4.45	2.78	2.63	3.96	2.81	6.50	8.42	14.46	67.84
Wigtown—Galloway Hse	2.64	4.03	.88	2.49	2.58	2.23	1.81	1.79	1.60	3.34	5.70	6.79	35.94

TABLE No. 2.—TOTAL PRODUCE OF WHEAT, BARLEY, AND OATS, AVERAGE AND YIELD per Acre in the Year 1910, compared with the YIELD for the Years 1909 and 1908, and the AVERAGE of the Ten Years, 1900-1909, in each COUNTY OF SCOTLAND.

COUNTIES.	WHEAT.					BARLEY, INCLUDING BEER.					OATS.				
	Total Produce in 1910.	Acreage in 1910.	Yield per acre.			Total Produce in 1910.	Acreage in 1910.	Yield per acre.			Total Produce in 1910.	Acreage in 1910.	Yield per acre.		
			1910.	1909.	1908.			1910.	1909.	1908.			1910.	1909.	1908.
Aberdeen	Qrs. 49	12	32.92	32.00	..	75,603	18,156	32.43	34.51	33.83	190,389	35,78	35.78	37.10	35.63
Argyll	5	5,592	40.00	50.00	..	6,719	1,414	38.01	40.74	39.72	17,284	17,191	34.57	36.26	31.88
Ayr	5,592	1,022	43.22	44.97	43.16	3,558	7,042	31.60	39.93	39.05	275,467	49,902	49.99	51.43	47.48
Barr	8,158	1,730	37.73	37.98	14.25	37,813	19,598	34.90	38.27	36.42	235,651	49,902	37.78	39.68	38.07
Berwick	6	1	48.00	..	..	55,437	19,598	34.90	38.27	36.42	148,756	31,039	38.35	36.01	38.07
Bute	1,653	295	44.52	42.00	40.94	1,100	21	38.29	37.97	35.24	1,898	4,679	37.44	37.66	38.28
Caithness	1,653	295	44.52	42.00	40.94	3,411	979	37.87	38.93	38.61	120,711	32,837	37.87	37.87	38.28
Clackmannan.	1,653	295	44.52	42.00	40.94	1,501	322	37.29	40.13	33.77	16,175	3,922	42.82	40.80	37.42
Dumfries	2,500	538	34.01	36.23	34.81	1,506	123	32.94	32.69	34.52	36,68	7,025	41.59	43.58	39.18
Dumfries	2,500	538	34.01	36.23	34.81	2,751	590	37.91	39.58	37.66	189,299	41,333	38.64	38.49	36.60
Edinburgh	30,538	5,656	43.19	48.39	48.23	49,613	5,684	40.54	44.12	43.47	101,564	20,477	39.68	42.88	43.00
Elgin or Moray	2,649	11,238	40.83	44.32	42.03	49,613	10,218	33.36	38.43	33.75	185,854	24,107	45.03	48.53	44.42
Fife	4,624	9,646	36.35	40.28	38.62	119,214	19,578	29.02	38.43	41.07	387,80	39,496	37.65	39.88	41.67
Forfar	43,834	9,646	36.35	40.28	38.62	73,356	14,922	39.33	43.91	40.14	113,646	16,279	40.17	45.20	43.86
Glasgow	31,897	6,438	35.84	44.42	43.94	25,030	6,663	30.05	38.49	25.51	285,830	48,344	38.95	52.66	49.89
Inverness	1,520	376	33.39	36.03	32.62	3,800	11,147	25.70	30.98	32.00	132,101	27,955	37.80	40.06	38.87
Kinross	3,651	874	44.59	43.67	38.00	1,744	364	38.33	40.26	33.66	38,596	6,187	36.98	35.85	34.01
Kirkcubright	303	95	36.73	38.17	35.08	213	373	30.61	38.94	38.50	34,67	25,631	36.24	41.26	37.27
Leath	7,169	1,732	33.00	36.93	35.08	1,427	373	30.61	38.94	38.50	163,237	32,837	37.69	34.64	33.77
Linlithgow	2,293	1,945	38.17	46.30	43.36	12,619	2,412	41.83	45.33	43.12	33,356	9,993	42.71	46.08	43.49
Nairn	216	54	32.00	..	..	9,839	2,621	30.00	31.80	26.78	30,584	6,090	34.00	36.04	32.07
Orkney	..	..	..	..	..	18,431	4,496	32.89	32.61	35.71	127,588	92,968	30.96	29.25	30.54
Perth	25,038	5,502	36.40	37.39	38.74	1,574	424	29.70	31.48	30.19	38,537	7,230	33.32	34.37	34.49
Perth	25,038	5,502	36.40	37.39	38.74	43,728	10,089	34.67	38.01	39.46	384,837	66,842	40.08	44.18	41.96
Ross and Cromarty	7,895	1,802	39.36	43.86	39.56	40,309	10,413	30.97	33.20	32.30	135,231	29,872	36.22	38.64	38.66
Roxburgh	1,348	1,479	33.73	39.28	41.13	47,676	11,582	32.93	38.97	37.93	127,917	27,854	37.41	39.63	32.01
Selkirk	1,53	14	30.00	..	..	1,178	347	27.15	35.60	35.49	21,965	4,672	37.61	35.23	35.33
Shetland	..	..	..	..	..	1,198	27.80	25.39	30.16	24.52	30,074	7,839	30.73	28.56	29.28
Stirling	8,568	1,534	44.63	50.75	46.46	4,088	1,198	27.80	25.39	29.91	81,015	18,039	37.26	40.94	40.16
Sutherland	10	10	26.00	..	..	8,019	1,836	34.94	42.86	43.14	80,075	17,995	36.51	38.48	37.32
Wigtown	501	110	36.41	35.02	32.76	3,377	829	32.59	33.40	32.13	33,482	7,995	36.34	37.77	36.35
Total	244,881	52,797	37.10	41.19	41.39	797,157	191,620	33.28	37.48	36.39	4,535,142	958,150	37.87	40.18	38.76

↑ Average of 7 years only.

* Average of 6 years only.

TABLE No. 3.—TOTAL PRODUCE OF BEANS, PEAS, AND POTATOES, ACREAGE AND YIELD PER ACRE in the Year 1910, compared with the YIELD for the Years 1909 and 1908, and the AVERAGE of the Ten Years, 1900-1909, in each COUNTY of SCOTLAND.

COUNTIES.	BEANS.						PEAS.						POTATOES.									
	Total Produce in 1910.	Acreage in 1910.	Yield per acre.				Total Produce in 1910.	Acreage in 1910.	Yield per acre.				Total Produce in 1910.	Acreage in 1910.	Yield per acre.							
			Average of the Ten Years 1900-1909.						Average of the Ten Years 1900-1909.						Average of the Ten Years 1900-1909.							
			1910.	1909.	1908.	Bush.			1910.	1909.	1908.	Bush.			1910.	1909.	1908.	Bush.	1910.	1909.	1908.	Tons.
Aberdeen	119	41	23.24	23.37	22.87	24.91	107	8	16.19	17.51	17.20	19.55	43,191	7,063	7.04	6.24	5.05					
Argyll	147	49	23.24	23.37	22.87	24.91	107	8	38.62	35.62	34.00	21.90	83,849	9,849	9.88	9.29	8.07					
Ayr	5,902	1,177	40.12	33.88	35.70	34.55	39	22	28.66	23.30	24.00	21.90	13,675	1,909	7.16	7.03	6.43					
Banff	384	99	31.07	24.00	24.60	28.50	66	11	28.00	13.50	27.30	25.05	21,688	2,849	7.59	7.46	6.15					
Berwick	3,510	778	36.09	35.43	41.23	35.99	89	5	24.40	21.67	21.71	20.86	7,016	995	7.58	7.56	4.49					
Bute	197	62	26.37	23.70	22.50	24.21	35	3	40.00	36.00	36.00	—	6,783	1,546	4.39	4.80	5.17					
Cathness	2,436	400	48.71	41.32	41.62	38.52	15	8	30.50	30.60	30.40	27.54	15,358	2,110	7.23	7.23	8.42					
Clackmannan	354	86	32.91	26.85	26.07	31	15	4	28.00	27.25	26.67	24.63	25,543	3,450	7.40	6.72	7.92					
Dumbarton	55	14	31.57	29.60	31.00	29.60	14	4	34.48	30.64	32.13	29.76	54,796	6,368	8.60	7.13	8.22					
Dumfries	186	45	33.00	36.06	31.16	34.75	617	120	25.36	24.60	19.45	21.98	11,925	1,871	6.37	6.75	6.52					
Edinburgh	110	26	32.96	33.67	22.04	26.21	35	11	31.50	34.92	31.53	28.79	105,562	15,802	6.68	6.50	8.64					
Elgin or Moray	4,780	969	39.46	37.44	38.56	36.17	127	37	27.43	28.53	33.00	30.80	16,393	15,393	4.71	5.38	7.13					
Fife	1,837	130	33.05	36.02	30.38	32.85	55	14	34.83	34.99	37.33	33.60	62,202	8,934	6.96	7.32	8.10					
Forfar	1,593	365	34.93	36.02	36.53	36.44	505	116	27.00	23.00	19.20	19.56	22,877	5,998	3.81	3.31	4.64					
Galloway	10	3	25.67	19.71	16.00	18.97	3	1	29.04	29.02	30.00	30.91	17,865	3,286	5.44	4.34	6.34					
Inverness	653	157	33.28	33.23	33.38	34.51	102	53	25.00	17.00	18.67	23.75	9,212	5,614	7.08	6.87	7.52					
Kincardine	44	8	44.00	40.00	35.73	34.83	3	3	20.71	20.91	20.71	22.99	36,042	4,725	6.12	5.18	6.62					
Kirkcubright	103	22	37.36	40.23	42.67	35.23	3	7	84.00	33.89	32.00	31.79	18,014	2,266	7.95	7.22	8.01					
Leven	1,388	299	31.79	31.92	31.30	31.35	48	10	30.00	33.60	29.39	32.81	1,347	337	4.00	5.00	4.76					
Linlithgow	838	208	36.07	37.26	37.21	35.98	42	6	34.60	29.92	33.60	28.10	11,248	2,762	4.07	6.14	6.06					
Nairn	8	2	32.00	32.00	32.00	—	28	10	34.60	29.92	33.60	28.10	92,597	14,163	6.54	6.14	8.29					
Orkney	..	..	..	..	..	..	..	..	25.61	21.81	24.00	36.11	20,085	2,863	7.02	6.78	6.42					
Peebles	6,889	1,572	34.80	31.35	28.38	33.54	22	5	29.50	26.57	30.71	29.38	28,398	7,036	4.00	4.56	4.53					
Perth	916	179	40.92	40.86	36.80	38.83	44	19	26.00	29.33	..	28.48	7,809	6.31	6.62	7.25	6.06					
Renfrew	131	30	35.03	34.64	28.00	18.04	58	18	..	..	..	..	1,301	1,293	6.74	5.84	5.99					
Ross and Cromarty	1,249	263	38.00	32.94	35.62	33.35	29	8	37.00	35.00	32.00	30.32	13,221	2,722	4.86	2.75	5.43					
Roxburgh	99	22	36.00	32.00	..	..	6	2	22.00	24.00	24.00	18.62	21,654	3,035	7.14	6.55	7.76					
Selkirk	..	..	..	..	..	..	..	..	..	..	..	..	7,571	1,460	5.19	5.70	4.55					
Shetland	12,913	2,399	44.93	46.00	44.51	38.28	106	23	..	..	..	..	12,405	1,906	9.50	6.56	7.76					
Stirling	2	1	17.00	20.00	..	14.94	3	1	..	..	..	..	878,800	136,837	6.42	6.16	7.30					
Southland	1,044	187	44.68	29.50	30.97	30.08	..	..	29.38	28.15	28.76	27.08	..	..	..	..	..					
Wigtown	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..					
Total	46,447	9,492	39.14	36.99	36.99	35.11	2,114	566	29.88	28.15	28.76	27.08	878,800	136,837	6.42	6.16	7.30					

* Average for 6 years only.

† Average for 7 years only.

‡ Average for 8 years only.

§ Average for 9 years only.

TABLE No. 4.—TOTAL PRODUCE OF TURNIPS (including SWEDS) and MANGELS, ACREAGE and YIELD per Acre in the Year 1910, compared with the YIELD for the Years 1909 and 1908, and the AVERAGE of the Ten Years, 1900-1909, in each COUNTY OF SCOTLAND.

COUNTIES.	TURNIPS AND SWEDS.				MANGELS.						
	Total Produce in 1910.	Acreage in 1910.	Yield per Acre.			Total Produce in 1910.	Acreage in 1910.	Yield per Acre.			Average of the Ten Years, 1900-1909.
			1910.	1909.	1908.			1910.	1909.	1908.	
Aberdeen	Tons. 1,560,087	Acres. 86,437	Tons. 18.05	Tons. 16.68	Tons. 14.50	Tons. 567	38	Tons. 14.92	Tons. 9.44	Tons. 12.67	Tons. 12.28
Argyll	5,615	17.05	17.05	17.05	14.40	48	48	9.76	13.58	13.15	9.89
Ayr	157,091	7,077	22.20	17.08	16.43	11,601	520	22.31	18.05	23.08	19.58
Banff	403,660	21,469	18.50	19.71	20.73	11,170	21	8.10	11.36	8.00	9.66
Berwick	626,327	25,580	24.45	18.12	21.56	4,874	245	19.89	21.23	22.14	18.67
Bute	22,521	1,355	16.62	17.28	19.46	16.39	12	15.17	16.80	18.29	15.69
Cathness	230,584	13,035	17.69	19.99	20.08	15.83	1	10.00	10.00	10.00	9.19
Clackmannan	13,737	816	16.53	12.56	12.57	11.44	1	10.00	10.00	10.00	15.97
Dumfries	29,264	1,853	21.10	21.81	22.81	18.14	21	18.14	17.00	20.89	15.97
Dunbarton	305,931	17,280	17.70	15.08	16.74	16.05	306	13.82	18.06	20.92	17.23
Edinburgh	224,164	10,639	22.01	19.74	22.29	19.51	74	21.04	18.88	23.74	21.90
Elgin or Moray	279,422	14,952	18.51	20.37	20.45	18.36	180	20.00	21.00	17.00	17.24
Fife	380,401	23,166	16.65	15.09	18.65	15.92	77	12.99	12.70	11.24	11.87
Forfar	679,763	32,383	20.99	19.39	22.86	19.25	30	23.53	22.07	26.85	18.49
Glasgow	297,737	14,643	20.33	20.28	22.43	19.07	157	18.38	19.33	21.75	20.45
Haddington	140,738	10,419	13.51	16.55	15.17	13.77	84	12.00	12.57	20.00	14.86
Inverness	245,914	16,690	14.73	12.60	14.29	13.47	160	10.00	10.00	..	13.71
Kincardine	41,979	2,486	16.89	13.46	13.55	14.47	96	21.70	20.77	23.56	19.52
Kinross	219,129	11,339	18.53	17.39	18.16	17.57	41	7.85	6.76	7.88	10.80
Kirkcubright	174,693	9,582	18.23	17.99	18.83	18.42	322	20.60	19.31	19.44	16.98
Leamark	71,239	3,462	20.58	20.31	21.89	18.39	10	14.00	15.00	17.00	15.62
Linlithgow	57,709	4,129	14.00	14.82	16.81	16.26	56	..	..	..	..
Nairn	134,843	14,246	9.47	9.81	10.62	9.79	..	..	..	..	..
Orkney	80,737	3,712	21.75	19.77	21.72	19.77	1	19.00	16.00	22.00	18.87
Perth	510,912	27,412	18.64	18.27	20.26	17.25	24	13.08	15.36	18.00	14.45
Perth	37,817	2,088	18.11	16.91	17.85	16.23	37	16.86	13.45	14.59	13.91
Renfrew	231,941	15,528	14.94	17.71	15.26	9.69	731	14.77	15.76	18.47	9.75
Rose and Cromarty	20,397	1,951	18.12	18.12	17.42	16.84	58	18.03	15.82	15.42	16.34
Roxburgh	397,912	20,367	19.51	17.36	18.00	16.09	2	16.00	16.00	..	..
Selkirk	42,876	2,463	17.27	17.36	18.00	13.22	..	..	..	..	..
Shetland	15,158	1,354	11.19	10.06	13.48	15.48	..	..	..	..	..
Shirning	94,940	4,062	23.57	24.11	22.66	17.13	9	21.44	18.67	25.08	16.17
Strathclyde	49,760	3,067	16.22	17.22	17.70	10.29	..	..	..	..	..
Struthland	288,851	14,361	20.26	15.83	20.71	17.89	360	18.31	19.00	23.81	19.21
Wigtown	..	..	..	..	..	..	..	..	..	..	..
Total	8,162,573	442,447	18.45	17.30	18.86	16.06	42,066	18.57	17.56	21.47	17.74

* Crop failed.

† Average for 8 years only.

‡ Average for 7 years only.

TABLE No. 6.—NUMBER OF HORSES, CATTLE, SHEEP, AND PIGS IN EACH COUNTY OF SCOTLAND AS RETURNED ON JUNE 5, 1911.

COUNTIES.	HORSES (including Ponies).					CATTLE.				SHEEP.				
	Used solely for Agriculture, &c.*	Stallions.†	Unbroken Horses.		Total.	Cows and Heifers in Milk.	Cows and Heifers in Calif.	Other Cattle.		Total.	1 Year Old and above.	Under 1 Year.	Total.	Pigs.
			1 Year & above.	Under 1 Year.				2 Years & above.	Under 2 Years.					
1. Aberdeen	22,491	86	5,551	2,262	31,605	37,995	4,620	50,022	82,570	175,207	125,329	99,961	225,290	17,044
2. Argyll	4,405	37	1,266	528	6,594	17,543	3,697	10,807	24,772	56,819	552,095	285,847	837,942	6,089
3. Argyll	7,314	27	1,423	517	5,800	10,791	10,791	12,998	37,022	105,848	215,417	140,089	355,506	16,135
4. Banff	6,581	26	1,705	750	9,360	10,791	1,353	8,151	24,034	44,329	87,311	26,480	332,798	4,476
5. Berwick	4,171	145	654	369	5,245	2,593	330	6,451	9,585	18,019	168,445	164,353	332,798	4,476
6. Bute	944	5	191	174	1,283	2,970	634	1,354	4,283	9,241	28,503	15,312	43,815	740
7. Caithness	4,286	22	896	400	1,64	6,310	983	2,672	11,725	21,090	76,092	55,686	131,788	1,704
8. Clackmannan.	505	1	145	55	727	1,138	217	852	1,272	3,479	8,687	6,533	15,220	1,170
9. Dumbarton	1,851	9	262	109	1,59	6,429	1,630	2,162	9,830	13,851	45,893	28,230	74,123	1,559
10. Dumfries	5,582	92	1,304	443	7,901	17,115	5,245	11,082	29,780	63,222	826,787	237,742	554,529	10,649
11. Edinburgh	3,679	22	756	330	4,636	10,560	943	3,239	4,393	19,135	104,680	79,073	183,753	12,181
12. Elgin	7,761	19	1,466	389	5,061	5,645	607	5,444	11,709	23,495	32,239	20,695	52,924	8,881
13. Fife	8,260	46	1,797	603	5,89	10,811	1,729	23,946	18,066	53,686	98,027	49,900	167,504	8,955
14. Forfar	3,217	0	1,105	358	886	10,126	1,260	23,946	18,066	53,686	98,027	49,900	167,504	8,955
15. Haddington	7,055	28	1,233	897	3,33	17,591	3,571	6,177	9,488	11,179	74,759	56,119	180,848	2,889
16. Inverness	4,006	10	743	253	1,78	17,591	3,577	6,177	9,488	11,179	74,759	56,119	180,848	2,889
17. Kinross	3,859	7	1,116	400	503	5,935	282	1,099	4,038	6,655	17,204	13,856	34,040	850
18. Kirkcudbright	6,548	53	1,245	531	607	9,987	3,562	11,779	21,803	52,071	285,259	156,319	394,618	11,909
19. Lanark	1,080	2	228	93	417	3,957	9,155	10,846	22,053	71,247	150,339	95,924	246,263	9,899
20. Leithgow	5,126	33	935	586	1,73	6,853	8,115	2,797	3,660	11,250	14,268	7,754	22,022	1,985
21. Perth	847	4	142	44	87	1,124	1,582	834	3,491	6,294	12,940	5,647	18,587	729
22. Renfrew	9,963	57	1,093	746	598	14,834	2,008	3,453	16,135	29,418	18,141	18,115	86,256	2,515
23. Ross and Cromarty	2,473	16	496	136	337	12,938	3,847	1,248	3,637	6,773	116,162	86,256	202,448	592
24. Roxburgh	5,927	16	1,355	611	237	3,392	3,847	2,604	3,617	71,771	437,394	246,716	674,110	9,020
25. Selkirk	8,580	12	372	123	461	4,518	4,013	7,940	18,406	45,587	25,786	17,078	42,864	1,864
26. Shetland	570	1	44	9	62	686	1,169	5,503	8,740	18,530	291,859	246,092	537,951	3,324
27. Stirling	3,373	142	1,195	990	120	5,820	6,178	516	1,748	8,572	103,777	81,171	184,948	421
28. Sutherland	3,260	8	336	282	217	4,025	5,692	3,013	5,353	16,116	99,644	57,946	157,590	1,074
29. Wigtown	2,126	10	257	105	157	2,655	4,214	6,930	10,931	29,333	75,300	51,825	127,125	2,568
30. Wigtown	4,021	91	1,154	475	259	2,655	4,214	1,493	4,869	11,668	139,580	73,533	213,113	721
Total	150,305	1,057	31,783	13,427	9,902	361,721	70,443	295,730	502,118	1,200,017	4,318,894	2,845,448	7,164,342	171,115

* Including Mares kept for breeding. † Above two years old used, or intended to be used, for service.

TABLE NO. 7.—QUANTITIES AND VALUES OF CORN, MEAT, FOOD PRODUCTS,
in the Year 1911, with the

[From Trade and

	Quantities.			Values.		
	1909.	1910.	1911.	1909.	1910.	1911.
ANIMALS, LIVING:—	No.	No.	No.	£	£	£
Cattle	321,340	219,561	200,397	5,566,105	4,027,918	3,776,404
Sheep and lambs	8,131	427	47,673	12,923	754	74,174
Swine	..	..	..	..	..	..
Total value	..	..	..	5,579,028	4,028,672	3,850,578
GRAIN, FLOUR, &c. :—	Cwt.	Cwt.	Cwt.	£	£	£
Wheat	97,854,425	105,222,688	98,109,087	45,272,181	44,160,884	38,927,680
Wheat meal and flour . .	11,052,540	9,960,491	10,065,132	6,870,480	5,510,905	5,277,043
Barley	21,556,470	18,281,500	24,504,120	7,148,849	5,396,452	8,248,281
Oats	17,835,998	17,495,014	18,275,937	5,437,857	4,823,869	5,891,970
Peas	1,814,149	1,591,111	2,196,094	603,054	718,740	1,012,862
Beans	2,171,280	849,082	1,029,181	757,600	311,676	375,345
Maize or Indian corn . .	39,362,605	37,021,192	38,602,330	12,122,812	10,294,340	10,718,133
Maize-meal	384,140	461,624	643,810	127,751	158,953	224,415
Oatmeal	533,125	775,033	835,985	465,118	582,225	598,405
Offals of corn and grain, } including rice-meal }	3,344,080	4,371,736	3,973,470	782,623	1,020,570	902,601
Rice, exclusive of rice- meal—						
From British East Indies	2,524,032	3,409,294	2,986,747	1,089,176	1,408,244	1,305,873
From other countries . .	2,488,795	2,723,531	2,010,090	1,181,779	1,241,125	1,017,423
Other kinds of grain & corn	1,431,235	1,473,033	1,562,456	587,025	543,580	639,477
Other kinds of meal and } flour }	195,071	267,279	266,307	90,519	102,835	109,246
Total value	..	..	..	31,981,774	26,268,898	24,743,309
MEAT :—	Cwt.	Cwt.	Cwt.	£	£	£
Beef, salted	110,015	87,636	90,303	196,233	173,924	171,072
*Beef	6,140,522	7,015,498	7,362,434	10,293,406	11,745,146	11,136,223
*Mutton	4,761,838	5,405,923	5,337,451	7,839,195	9,802,358	9,588,646
Bacon	4,625,463	3,863,339	4,868,738	13,801,665	13,891,274	14,463,414
Hams	1,129,029	719,126	954,811	3,112,896	2,526,595	2,927,610
Pork, salted (not bacon or } hams) }	258,539	227,191	236,749	312,862	304,168	293,163
*Pork	423,444	479,907	452,932	1,023,322	1,196,797	1,120,764
*Meat, unenumerated . .	693,301	707,113	728,072	1,274,009	1,310,759	1,315,439
" " salted	55,601	70,568	88,357	98,645	102,086	123,386
Meat, preserved, otherwise } than by salting }	609,934	742,542	946,180	2,333,413	2,514,089	3,036,967
*Rabbits (dead)	579,356	664,190	525,666	727,954	837,122	712,600
Total of dead meat . .	19,393,092	19,933,083	21,589,693	41,015,605	43,905,368	44,889,175
DAIRY PRODUCTS:—	Cwt.	Cwt.	Cwt.	£	£	£
Butter	4,062,812	4,325,539	4,302,956	22,424,962	24,498,450	24,802,111
Margarine	368,292	1,120,812	944,405	2,243,737	2,985,344	2,461,325
Cheese	2,390,090	2,456,340	2,343,322	6,329,363	6,800,876	7,139,942
Total	7,321,194	7,902,691	7,595,683	31,498,562	34,283,570	34,203,378

* Fresh, Chilled, and Frozen.

AND ARTICLES AFFECTING AGRICULTURE, imported into the United Kingdom
Corresponding Figures for 1909 and 1910.

Navigation Returns.]

	Quantities.			Values.		
	1909.	1910.	1911.	1909.	1910.	1911.
POULTRY (alive or dead)	..	..	..	£ 920,697	£ 821,292	£ 918,197
GAME (alive or dead)	..	..	..	108,098	123,615	79,127
Eggs	Gt. Hunds. 17,710,481	Gt. Hunds. 18,344,187	Gt. Hunds. 19,057,896	7,283,982	7,296,145	7,065,609
Total value	..	..	..	8,262,727	8,241,052	8,062,938
FRUIT, VEGETABLES, &c. :—	Cwt.	Cwt.	Cwt.	£	£	£
Apples	8,129,646	8,242,205	8,332,618	2,007,911	2,189,809	2,232,992
Cherries	185,464	65,485	135,142	210,679	121,691	186,532
Plums	485,558	385,279	372,662	473,550	420,971	893,180
Pears	569,535	510,944	585,777	504,475	527,256	544,706
Grapes	490,008	673,829	701,374	508,111	679,917	785,326
Oranges	6,202,270	5,469,601	5,284,142	2,522,491	2,267,474	2,383,386
Lemons	1,037,989	990,047	852,293	475,967	452,115	476,647
Unenumerated	464,212	470,148	408,006	306,031	302,425	322,508
Onions	Bushels. 7,470,772	Bushels. 8,123,910	Bushels. 8,598,722	1,213,518	1,042,674	1,222,278
Potatoes	Cwt. 4,281,078	Cwt. 3,898,786	Cwt. 3,262,891	1,407,875	1,201,561	1,307,446
Vegetables, unenumerated } (raw)	..	..	..	402,744	420,154	426,219
Hops	140,777	176,781	169,184	476,436	788,056	1,095,218
Total value	..	..	..	10,509,788	10,413,603	11,376,388
OTHER ARTICLES :—	Cwt.	Cwt.	Cwt.	£	£	£
Lard	1,760,580	1,452,498	1,822,768	4,856,026	4,520,074	4,251,758
Wool, sheep and lambs'	Lb. 803,432,548	Lb. 797,418,408	Lb. 795,091,310	31,886,375	33,811,587	33,001,622
Wood and timber— Hewn (pit-props or pit- wood)	Loads. 2,627,633	Loads. 2,320,586	Loads. 2,896,209	2,929,640	3,136,828	3,376,091
Sawn or split, planed or dressed	5,721,901	5,996,224	5,572,260	15,469,624	17,016,468	15,968,977
Staves	126,339	167,205	158,396	546,187	694,016	759,318
Oilseed-cake (not sweetened)	Tons. 328,763	Tons. 317,066	Tons. 337,425	2,130,394	2,109,604	1,958,309
Seeds— Clover and grass	Cwt. 319,001	Cwt. 286,976	Cwt. 233,812	727,605	664,170	550,892
Cotton	Tons. 600,377	Tons. 690,171	Tons. 596,959	4,152,087	4,865,863	4,398,675
Flax or linseed	Qrs. 1,697,428	Qrs. 1,489,259	Qrs. 1,398,874	3,762,101	4,495,718	4,728,536
Rape	189,708	251,324	232,199	261,286	448,580	431,376
*Soya beans	Tons. ..	Tons. 421,581	Tons. 222,657	..	8,047,048	1,652,383
Bones (whether burnt or not)	89,031	44,505	45,876	175,672	201,539	226,174
Guano	20,321	20,395	34,124	89,147	107,958	108,000
Basic slag	15,286	16,588	22,666	25,927	26,985	37,389
Nitrate of soda (cubic nitro)	90,207	126,498	128,487	860,860	1,161,127	1,189,019
Phosphate of lime and rock phosphate	451,807	455,598	493,413	747,367	722,508	779,706
Cotton, raw of 100 lb.	Centals. ..	Centals. ..	Centals. 22,070,831	60,295,049	71,711,906	71,155,514
Hemp	Tons. 114,799	Tons. 129,733	Tons. 140,805	2,734,716	3,122,219	3,267,950
Flax	90,660	88,443	80,121	3,542,919	3,655,949	3,798,256
Hides untanned— Dry	Cwt. 468,993	Cwt. 516,896	Cwt. 462,354	1,602,094	1,855,804	1,654,556
Wet	737,602	764,155	658,059	2,185,974	2,417,028	2,091,919
Petroleum	Gallons. 358,102,367	Gallons. 345,469,836	Gallons. 365,880,233	6,121,202	5,662,882	5,693,901

* Not shown separately prior to 1910.

TABLE NO. 8.—QUANTITY AND VALUE OF CORN, &c., imported into the United Kingdom in the undermentioned Years.

[From Trade and Navigation Returns.]

	Quantities.			Values.		
	1909.	1910.	1911.	1909.	1910.	1911.
Wheat from—	Cwt.	Cwt.	Cwt.	£	£	£
Russia	17,844,840	28,941,600	18,106,100	8,178,885	12,021,407	7,087,078
Germany	364,200	98,100	51,800	162,628	42,212	20,028
Turkey	49,300	134,800	413,800	18,601	47,005	181,564
Roumania	527,200	939,200	1,952,300	250,481	374,370	787,381
United States	15,504,100	10,948,900	12,989,229	6,958,106	4,757,179	5,249,076
Chile	1,670,200	683,500	112,700	782,015	248,021	43,425
Argentine Republic	20,087,800	15,131,800	14,748,600	9,284,501	6,165,090	5,736,698
British East Indies	14,635,200	17,916,738	20,161,518	6,944,466	7,408,549	7,894,578
Australia	9,700,100	13,117,500	18,010,720	4,683,770	5,686,576	5,658,459
New Zealand	701,400	630,600	780,500	331,297	239,526	280,822
Canada	16,615,745	16,449,200	14,373,700	7,604,262	7,059,659	5,840,325
Other countries	206,340	281,200	608,620	98,119	111,290	248,251
Total	97,854,425	105,222,638	98,109,087	45,272,131	44,160,884	38,927,680
Wheat, meal, and flour, from—						
Germany	586,660	587,900	282,025	320,963	308,955	141,821
Belgium	64,900	65,250	35,300	37,265	35,808	16,942
France	534,680	438,900	399,700	292,909	218,207	173,177
Austria-Hungary	107,698	124,207	106,050	96,198	96,768	81,550
United States	6,929,011	5,123,780	5,116,411	3,988,223	2,885,602	2,697,066
Argentine Republic	85,400	101,400	88,000	37,479	36,883	33,652
Australia	521,000	407,800	445,400	320,546	224,993	223,474
Canada	2,059,400	2,783,701	3,268,768	1,188,454	1,565,236	1,769,881
Other countries	163,791	327,553	823,478	88,443	148,953	139,480
Total	11,052,540	9,960,491	10,065,132	6,370,480	5,510,905	5,277,048
Barley	21,556,470	18,281,500	24,504,120	7,143,849	5,396,452	8,248,281
Oats	17,835,998	17,495,014	18,275,937	5,437,857	4,823,809	5,391,970
Peas	1,314,149	1,591,111	2,196,094	603,054	718,740	1,012,862
Beans	2,171,230	849,082	1,029,131	757,600	311,676	375,346
Indian corn or maize	39,362,605	37,021,192	38,602,380	12,122,812	10,294,340	10,713,188
Indian corn meal	834,140	461,624	643,810	127,751	158,953	224,415
Oatmeal	583,125	775,033	835,985	465,118	582,225	598,405
Offals of corn and grain, including rice-meal	3,344,080	4,371,786	3,973,479	782,623	1,020,570	902,601
Rice, exclusive of rice-meal—						
From Brit. East Indies	2,524,032	3,409,294	2,986,747	1,069,176	1,403,244	1,305,878
From other countries	2,488,795	2,723,531	2,010,090	1,131,779	1,241,125	1,017,423
Other kinds of grain and corn	1,431,225	1,473,083	1,562,456	587,025	542,580	639,477
Other kinds of meal and flour	195,071	267,279	266,807	90,519	102,835	109,246
Total of corn, &c.	..	..	..	81,981,774	76,268,398	74,748,809

TABLE NO. 9.—RETURN OF THE AVERAGE PRICES OF WOOL in the Years 1909 and 1910.

Years.	Australian.	South African.	English Fleeces.
	Per lb.	Per lb.	Per lb.
	s. d.	s. d.	s. d.
1909	0 10½	0 8½	0 8½ to 0 13½
1910	0 10½	0 9	0 9½ to 0 15

TABLE No. 10.—QUANTITY AND VALUE OF DEAD MEAT imported into the United Kingdom in the undermentioned Years.

	Quantities.			Values.		
	1909.	1910.	1911.	1909.	1910.	1911.
BACON, from—	Cwt.	Cwt.	Cwt.	£	£	£
Denmark	1,809,745	1,704,416	2,122,087	5,801,882	6,341,726	6,690,987
United States	2,189,068	1,806,921	1,817,835	6,067,473	4,458,293	5,067,533
Canada	443,386	411,935	616,807	1,364,357	1,449,687	1,793,946
Other countries	183,279	350,117	318,000	578,453	1,146,618	910,998
Total	4,625,468	3,863,389	4,868,738	13,801,665	13,391,274	14,463,414
BEEF (salted), from—						
United States	104,741	79,822	88,162	188,775	162,210	167,604
Other countries	5,274	7,814	2,141	7,463	11,714	3,468
Total	110,015	87,636	90,303	196,238	173,924	171,072
*BEEF (fresh and refrigerated)—						
United States	856,216	477,147	174,350	1,949,386	1,070,290	897,601
Uruguay	127,924	142,269	65,485	175,149	202,645	88,543
Argentine Republic	4,308,155	4,898,869	6,111,013	6,783,573	8,256,984	9,242,086
Australia	411,577	880,695	710,628	590,335	1,289,493	967,720
New Zealand	454,368	532,830	257,935	660,319	797,585	874,265
Denmark	54,778	42,293	4,125	131,926	107,750	11,188
Other countries	27,509	41,895	38,893	52,767	70,440	54,820
Total	6,140,522	7,015,498	7,362,434	10,298,406	11,745,146	11,136,223
HAMS, from—						
United States	1,073,569	665,775	887,303	2,952,084	2,329,526	2,712,287
Canada	53,593	37,021	62,295	154,222	138,232	197,524
Other countries	1,867	10,730	5,213	6,590	58,837	17,799
Total	1,129,029	719,126	954,811	3,112,896	2,526,595	2,927,610
*MEAT (unenumerated, fresh and refrigerated), from—						
Netherlands	273,411	247,564	207,837	660,133	595,498	501,026
United States	142,178	115,784	106,074	248,254	224,563	208,155
Argentine Republic	252,126	281,364	334,665	284,788	347,262	440,988
Other countries	86,687	182,969	165,853	181,484	246,122	288,597
Total	754,402	777,681	814,429	1,874,654	1,413,445	1,438,716
MEAT, preserved otherwise than by salting—						
Beef	338,022	453,041	687,646	1,351,694	1,486,055	1,905,534
Mutton	125,029	150,292	144,544	301,516	359,702	339,414
Other sorts	151,933	138,809	163,990	350,201	668,282	792,019
Total	609,984	742,542	946,180	2,333,413	2,514,039	3,036,967
*MUTTON (fresh and refrigerated)—						
Netherlands	185,622	139,699	113,386	451,194	340,189	277,576
Uruguay	65,380	90,485	76,623	73,573	141,667	109,724
Argentine Republic	1,437,608	1,419,653	1,782,066	2,024,889	2,322,454	2,896,589
Australia	943,758	1,525,899	1,291,636	1,574,212	2,533,695	2,226,676
New Zealand	1,978,023	2,104,173	1,981,467	3,499,053	4,238,178	3,926,751
Other countries	151,452	120,514	92,213	211,274	226,680	151,330
Total	4,761,838	5,405,923	5,337,451	7,839,195	9,802,858	9,568,646
PORK (salted, not Bacon or Ham.s), from—						
Denmark	197,594	179,888	186,477	193,501	190,529	186,439
United States	56,639	38,866	45,769	113,555	101,645	99,057
Other countries	5,806	8,437	4,503	5,806	11,994	7,667
Total	258,839	227,191	236,749	312,862	304,168	293,163
*PORK (fresh and refrigerated)—						
Netherlands	373,876	366,197	370,345	905,741	900,116	940,068
Belgium	10,215	8,548	14,537	25,359	24,006	41,645
United States	7,255	1,044	4,099	13,894	2,880	9,324
Other countries	32,598	103,818	63,951	76,328	269,795	129,727
Total	428,444	479,907	452,932	1,023,322	1,196,797	1,120,764
*RABBITS (dead), from—						
Belgium	44,033	47,761	42,524	123,119	183,766	118,997
Australia	488,994	513,879	394,155	506,378	567,955	462,544
New Zealand	52,016	90,389	73,703	56,120	97,947	85,489
Other countries	14,813	12,661	15,284	42,337	37,454	45,570
Total	579,856	664,190	525,666	727,954	837,122	712,600
Total of dead meat	19,398,092	19,983,083	21,589,693	41,015,605	43,905,368	44,889,175

* In the Official Returns from 1909 the imports are shown separately as "Fresh," "Chilled," and "Frozen."

TABLE No. 11.—QUANTITIES AND VALUES OF BUTTER, MARGARINE, CHEESE, AND Eggs imported into the United Kingdom in each Year from 1909 to 1911 inclusive.

[From Trade and Navigation Returns.]

	Quantities.			Values.		
	1909.	1910.	1911.	1909.	1910.	1911.
BUTTER from—	Cwt.	Cwt.	Cwt.	£	£	£
Russia . .	601,712	584,040	638,284	3,001,764	3,045,722	3,312,569
Sweden . .	312,142	345,684	360,357	1,801,095	2,022,398	2,183,770
Denmark . .	1,764,027	1,726,091	1,707,178	10,233,370	10,208,192	10,509,137
Netherlands .	148,567	154,537	104,655	797,162	843,318	586,479
France . .	413,306	361,249	171,080	2,318,887	2,116,072	1,066,702
United States .	693	766	23,316	3,575	4,075	120,664
Argentine Republic .	73,553	65,944	24,209	392,014	374,285	145,154
Victoria . .	180,167	307,929	441,481	923,804	1,622,529	2,336,382
New S. Wales .	132,708	217,780	281,588	664,959	1,181,953	1,411,271
Queensland .	71,744	113,384	151,330	354,790	612,030	739,685
New Zealand .	278,581	362,674	276,446	1,472,219	2,001,393	1,495,242
Canada . .	22,522	16,805	61,936	120,083	90,797	355,063
Other countries	63,090	68,666	61,096	341,240	370,686	339,993
Total .	4,062,812	4,325,539	4,302,956	22,424,962	24,493,450	24,602,111
MARGARINE from—	Cwt.	Cwt.	Cwt.	£	£	£
Netherlands .	818,901	1,069,558	896,086	2,113,035	2,782,636	2,322,668
France . .	23,369	32,288	28,633	79,007	106,809	95,184
Other countries	26,022	18,966	19,686	51,695	45,799	43,473
Total .	868,292	1,120,812	944,405	2,243,737	2,935,244	2,461,325
CHEESE from—	Cwt.	Cwt.	Cwt.	£	£	£
Netherlands .	285,329	231,832	207,917	669,827	567,360	525,097
Italy . .	77,228	85,267	75,153	251,954	275,658	247,258
United States .	54,617	38,247	150,321	154,588	105,400	432,019
Australia . .	599	3,710	12,602	1,676	10,772	86,749
New Zealand .	368,531	453,785	397,845	1,113,714	1,310,550	1,209,549
Canada . .	1,566,546	1,607,064	1,473,275	4,518,539	4,424,806	4,590,515
Other countries	37,240	36,435	31,209	119,565	115,330	98,755
Total .	2,390,090	2,456,340	2,348,322	6,829,863	6,809,876	7,139,942
EGGS from—	Great Hundreds.	Great Hundreds.	Great Hundreds.	£	£	£
Russia . .	8,154,635	9,217,586	10,041,888	2,929,487	3,282,194	3,794,408
Denmark . .	3,428,200	3,647,139	3,992,986	1,698,329	1,732,107	2,030,607
Germany . .	612,817	507,307	577,545	255,003	200,860	233,142
Netherlands .	615,669	592,821	607,364	275,861	259,770	282,805
France . .	1,047,850	907,599	652,036	475,335	417,545	303,515
Italy . .	875,753	746,841	771,107	400,450	350,238	366,859
Austria-Hungary .	1,300,246	1,370,121	1,022,554	547,005	555,998	423,722
Other countries	1,675,256	1,354,723	1,392,415	652,462	497,433	525,551
Total .	17,710,431	18,344,137	19,057,895	7,233,932	7,296,145	7,965,609

TABLE NO. 12.—NUMBER OF LIVE STOCK IN 1908, 1909, AND 1910, returned as entering the Markets at the Places scheduled under the Markets and Fairs (Weighing of Cattle) Act, 1891.

[From Agricultural Statistics, 1910.]

	CATTLE.			SHEEP.			SWINE.		
	1908.	1909.	1910.	1908.	1909.	1910.	1908.	1909.	1910.
Aberdeen .	65,471	65,483	68,004	242,418	233,788	219,382	13,406	11,097	10,452
Dundee .	19,498	21,551	20,063	28,788	33,556	31,567	4,394	3,807	3,661
Edinburgh	70,132	73,556	74,251	205,416	261,284	258,472	6,864	7,017	7,355
Stirling .	62,294	64,184	65,575	271,483	266,425	263,967	3,950	3,370	4,000
Glasgow .	81,706	86,856	89,472	358,756	409,667	385,804	3,631	3,578	5,144
Perth . .	118,408	126,887	118,453	526,370	573,789	471,430	12,638	12,885	13,626
	417,509	438,517	430,818	1,633,181	1,778,509	1,630,622	44,883	41,254	44,238

TABLE NO. 13.—AVERAGE PRICES OF FAT CATTLE PER CWT. (LIVE WEIGHT) at the undermentioned Places in each Year from 1903 to 1910, together with the average Prices for Scotland, England, and Great Britain, compiled from the Returns received under the Markets and Fairs (Weighing of Cattle) Act, 1891.

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Aberdeen . . .	33 4	32 8	32 6	32 5	32 8	33 6	34 5	35 10
Dundee . . .	33 8	32 7	32 0	31 11	32 8	33 5	34 0	35 8
Edinburgh . . .	35 5	34 10	33 10	34 2	35 1	36 5	37 2	38 7
Glasgow . . .	36 3	35 8	32 6	32 5	33 1	34 3	34 10	36 2
Perth . . .	35 1	33 8	34 4	34 6	35 8	37 0	37 11	40 3
SCOTLAND . . .	34 6	33 9	33 0	33 0	33 9	34 8	35 6	37 2
ENGLAND . . .	34 1	33 1	32 8	32 6	33 6	34 2	34 8	36 0
GREAT BRITAIN .	34 4	33 7	32 11	32 11	33 8	34 7	35 4	36 11

TABLE NO. 14.—NUMBER AND VALUE OF LIVE CATTLE, SHEEP, AND SWINE imported into the United Kingdom in the undermentioned Years. [*From Trade and Navigation Returns.*]

	Number.			Value.		
	1909.	1910.	1911.	1909.	1910.	1911.
CATTLE, from—				£	£	£
Channel Islands . . .	2,308	2,483	2,342	41,265	45,940	41,905
Canada . . .	118,583	78,691	42,239	1,922,082	1,442,781	781,436
United States . . .	205,449	188,387	155,816	3,602,758	2,539,197	2,963,063
Argentine Republic . . .	..	..	..	..	..	..
Other countries . . .	..	..	..	..	..	..
Total . . .	321,340	219,561	200,397	5,566,105	4,027,918	3,776,404
SHEEP AND LAMBS, from—						
Canada . . .	1,548	427	4,868	2,448	754	8,038
United States . . .	6,583	..	42,805	10,475	..	66,136
Argentine Republic . . .	..	..	..	..	..	..
Other countries . . .	..	..	..	..	..	..
Total . . .	8,131	427	47,673	12,923	754	74,174
SWINE (not separately enumerated)	..	..	..	..	..	..
TOTAL VALUE OF ANIMALS LIVING	..	..	..	5,579,028	4,028,672	3,850,578

TABLE NO. 15.—NUMBER OF HORSES, CATTLE, SHEEP, AND PIGS imported into Great Britain from Ireland in each of the Years 1905-1911.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.
HORSES :—							
Stallions . . .	202	257	190	249	234	277	228
Mares . . .	14,192	15,816	15,164	13,049	13,728	15,606	15,352
Geldings . . .	16,329	18,243	17,890	15,355	15,273	16,011	16,130
Total . . .	30,723	33,816	33,253	28,653	29,235	31,894	31,710
CATTLE: Oxen, Bulls, and Cows :—							
Fat . . .	224,943	240,566	292,104	258,695	265,952	260,260	269,066
Store . . .	455,667	473,425	492,790	528,886	505,312	543,788	590,294
Other cattle . . .	6,205	5,897	6,221	9,789	13,877	12,324	8,789
Calves . . .	62,816	55,486	50,858	64,850	52,785	52,809	26,480
Total . . .	749,131	775,874	841,973	861,670	837,426	869,181	605,529
SHEEP :—							
Sheep . . .	350,953	293,174	317,039	367,076	430,839	348,018	306,312
Lambs . . .	349,673	364,239	343,376	354,608	440,019	383,684	350,858
Total . . .	700,626	657,413	660,415	721,684	870,858	731,702	657,170
PIGS :—							
Fat . . .	362,791	409,510	448,578	371,537	316,891	301,576	323,574
Store . . .	1,032	19,920	33,329	15,939	10,237	22,495	18,766
Total . . .	363,823	429,430	481,907	387,476	327,128	324,071	342,340

EDINBURGH CORN-MARKET GRAIN TABLES for WHEAT, BARLEY, OATS, and BEANS, showing the Quantity offered for Sale, the Quantity Sold, the Highest, Lowest, and Average Prices; also the Bushel-weights of the Highest and Lowest Prices of each kind of Grain for every Market-day, likewise the Results for every Month, and the final Result for the year 1911.

WHEAT.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel-weights for			
						Highest Price.		Lowest Price.	
1911						lb.	lb.	lb.	lb.
Jan.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.				
4	476	416	34 0	29 0	32 9	63		63	59
11	518	458	34 6	31 6	33 7	63		63	61
18	869	509	34 6	31 0	32 11	63		62	63
25	623	518	34 6	28 0	33 0	63			58½
	2,486	1,901	34 4	30 3	33 1				
Feb.									
1	492	452	34 8	32 0	33 1	63		62	
8	925	765	34 0	28 0	32 1	65½		60½	
15	1,160	803	32 6	28 0	31 2	63		62	
22	439	373	32 0	27 0	31 1	63		60	
	3,016	2,393	33 1	29 4	31 9				
March									
1	379	359	32 6	27 6	31 2	63		60	
8	491	453	32 9	27 6	31 2	63		59½	
15	123	123	32 9	30 6	31 10	63		61	
22	406	406	33 3	29 0	31 10	64½		60½	
29	198	198	32 9	32 0	32 5	63½		63½	
	1,597	1,539	32 9	30 2	31 7				
April									
5	509	429	32 6	30 6	31 11		63	62	
12	484	371	32 6	29 0	31 7	62½	63	61	
19	560	534	33 0	31 0	32 3	63		60½	
26	906	706	34 0	30 0	32 11	64½		61½	
	2,459	2,040	32 9	30 2	32 3				
May									
3	768	663	34 0	32 0	33 2	64		62	
10	1,377	1,167	34 6	30 0	33 2	64		59½	
17	1,420	1,185	34 0	29 6	33 4	63		61	
24	1,259	1,204	34 0	31 3	33 2	65		62½	
31	795	545	33 3	31 6	32 6	63		62	63
	5,619	4,764	34 0	31 5	33 2				
June									
7	681	681	34 0	31 3	33 1	63		61	
14	1,302	1,232	33 6	27 6	32 8	64½		58	
21	976	943	33 9	32 0	33 1	65		63	
28	358	358	34 0	32 6	33 6	63		62	
	3,317	3,214	33 10	31 9	33 0				
July									
5	494	407	34 6	33 0	33 10	63½		63	
12	1,674	981	34 6	33 6	34 0	63		63	
19	..	..	..	..	..	..		..	..
26	1,714	685	34 6	31 6	32 7	63		62½	63
	3,882	2,073	34 6	32 11	33 6				

Note.—The 19th July was an official holiday during the King's Visit. No market was held.

WHEAT—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1911 Aug.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	1b. 1b.		1b. 1b.	
2	1,531	742	34 0	28 0	33 8	63		59	
9	1,595	668	33 9	32 0	33 4	62 63		62	
16	1,150	308	33 6	25 0	31 5	63		55	
23	944	149	32 6	27 6	31 3	63		62	
30	993	404	33 6	26 0	31 2	63		58½	
	6,213	2,271	33 8	27 5	32 6				
Sept.									
6	837	366	33 6	31 0	32 3	64		62 63	
13	1,681	1,177	33 6	28 6	31 11	63		59½	
20	1,260	928	35 0	30 6	31 10	63		62 63	
27	1,435	962	34 6	24 0	32 6	65½		55	
	5,213	3,433	34 0	29 10	32 1				
Oct.									
4	1,639	821	34 0	29 6	32 6	65½		60½	
11	1,065	763	35 0	31 6	32 8	65½		62	
18	969	569	36 6	32 0	33 10	65½		63	
25	951	458	36 6	31 6	33 9	65½		63	
	4,624	2,611	35 4	31 3	33 1				
Nov.									
1	708	356	36 6	32 6	34 2	65½		62	
8	920	783	36 6	32 9	33 9	65½		63	
15	1,067	729	35 0	30 0	33 0	63		62	
22	649	635	34 3	32 0	33 3	65		62½	
29	551	536	34 0	32 0	33 2	63		63	
	3,925	3,039	34 3	31 10	33 5				
Dec.									
6	995	907	34 3	32 6	33 7	63		63	
13	878	818	34 6	32 6	33 10	64		62	
20	813	773	34 6	33 3	33 11	63 64½		63	
27	1,028	1,028	34 6	33 3	33 11	64 64½		62	
	3,714	3,526	34 5	33 1	33 10				
Result for year	46,065	32,804	33 9	31 1	32 10				

BARLEY.

1911 Jan.							
4	595	420	28 0	21 0	25 3	56	56
11	829	604	28 0	21 9	26 8	56 56½	53
18	639	414	27 9	22 9	24 5	56	54
25	689	689	28 0	21 6	25 10	56	51½
	2,752	2,127	28 0	21 11	25 8		
Feb.							
1	695	635	30 0	24 3	27 8	56	54
8	617	445	30 0	24 0	27 3	56	54½
15	721	316	29 6	24 0	27 1	56	55
22	310	280	28 6	24 0	26 6	56	54
	2,343	1,676	29 4	24 1	27 3		

BARLEY—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1911						1b.	1b.	1b.	1b.
March	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.				
1	914	519	29 6	28 9	27 5	56		54	
8	541	224	35 0	26 6	28 3	56		54½	
15	457	267	30 0	26 6	28 3	56		54	
22	243	133	30 0	25 6	28 2	56		55	
29	281	143	31 0	29 0	29 8	55		55½	56
	2,436	1,286	29 11	27 2	28 1				
April									
5	178	80	30 6	27 3	29 9	56		55	
12	355	260	30 6	28 0	28 9	56		55	
19	206	18	30 0	28 0	28 8	56		55	
26	147	93	30 0	29 6	29 11	55½		55	
	886	451	30 2	28 1	29 2				
May									
3	117	70	30 0	29 6	29 9	55	56	56	
10	127	96	30 0	28 6	29 4		56	55	
17	119	52	30 6	28 0	28 9		56	54	
24	..	..	..	..	..	..	..	..	..
31	51	..	..	..	..	..	..	..	..
	414	218	30 1	28 9	29 4				
June									
7	20	..	..	..	..	..	..	..	..
14	103	82	29 6	29 0	29 2	55		55	
21	10	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..
	133	82	29 6	29 0	29 2				
July									
5	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..
	..	..	..	..	..				
Aug.									
2	..	..	..	..	..	..	..	..	..
9	200	..	..	..	..	..	..	..	..
16	290	290	31 3	30 0	30 7	56	56	56	56
23	2,225	1,615	31 6	28 0	30 1	56	57	55	55½
30	1,356	1,211	32 6	28 6	29 11		57	55	55
	4,071	3,116	31 6	28 7	30 1				
Sept.									
6	1,776	1,471	33 0	27 0	31 0	57		55	
13	1,715	1,528	33 0	28 6	31 6	56		55	
20	1,690	1,337	33 6	28 6	31 3	57		54½	55
27	1,009	741	35 6	25 6	32 8	57		52½	
	6,190	5,077	34 1	27 10	31 6				
Oct.									
4	875	725	34 0	28 0	32 4	56		51½	56
11	344	344	34 0	32 9	33 3	56		56	
18	415	360	35 0	32 0	33 11	56		56	
25	468	343	35 3	32 0	34 2	56		55	
	2,102	1,772	34 5	31 11	33 2				

BARLEY—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel-weights for			
						Highest Price.		Lowest Price.	
1911	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	lb.	lb.	lb.	lb.
Nov.									
1	273	223	36 0	35 3	35 8	56		56	
8	823	729	37 0	31 6	36 1	56		56	
15	336	233	39 0	36 0	37 8	56½		55½	
22	879	525	40 0	33 0	38 6	56		54	
29	873	713	39 6	37 6	38 5	56		56	
	3,184	2,423	37 9	35 10	37 5				
Dec.									
6	659	229	38 9	33 3	37 3	56		54	
13	356	245	39 6	33 6	37 4	58½		56	
20	443	159	37 6	36 0	36 6	56		56	
27	148	128	36 6	33 3	35 3	56		56	
	1,606	761	38 3	34 8	36 9				
Result for year }	26,117	18,989	33 3	29 8	31 0				

OATS.

1911							
Jan.							
4	1,918	721	20 6	17 3	18 8	44	42
11	2,221	1,150	21 6	16 6	19 3	44½	42
18	2,024	842	24 0	16 3	19 5	44½	40
25	2,161	1,149	21 3	17 0	19 7	44½	42
	8,319	3,662	21 9	16 10	19 3		
Feb.							
1	1,021	975	23 0	17 3	19 6	45½	41 42
8	2,546	1,071	22 0	14 0	19 5	45	42
15	2,703	1,198	23 0	17 6	20 4	44	42
22	2,654	956	23 0	17 0	19 4	44½	41 42
	9,824	4,200	22 7	17 0	19 8		
March							
1	2,878	1,844	23 0	17 0	19 10	44½	42
8	2,973	1,351	24 0	16 0	19 11	46½	42
15	2,613	1,151	25 0	17 3	20 3	44½	41
22	2,494	1,071	25 0	18 0	20 5	45	42 42½
29	1,787	804	22 0	18 6	20 6	44 44½	42
	12,745	5,721	22 10	17 5	20 2		
April							
5	1,457	982	24 0	17 6	20 5	44	42
12	1,415	839	22 9	19 3	20 7	44½	42
19	913	641	23 0	19 3	20 10	44	42
26	1,388	904	23 9	19 3	21 8	44½	42
	5,173	3,366	23 2	18 10	20 10		
May							
3	1,412	685	23 9	21 0	22 8	44½	42
10	1,614	368	24 0	20 0	22 5	44	43
17	1,747	652	24 0	21 6	23 2	44 45½	42 43
24	2,177	493	23 3	21 0	22 4	44½	42
31	1,891	465	23 3	21 6	22 4	44½	42 43
	8,841	2,663	23 8	21 4	22 8		

OATS—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for	
						Highest Price.	Lowest Price.
1911							
June	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	lb. lb.	lb. lb.
7	1,946	813	23 0	20 0	21 6	44½	44½
14	1,488	614	23 0	19 0	21 7	44½	42
21	785	262	23 0	19 3	21 5	44½	42
28	652	370	23 0	20 6	22 1	43½ 44	42 42½
	4,871	1,559	23 0	19 11	21 8		
July							
5	936	815	23 0	20 9	22 4	43½ 44½	42½
12	1,248	593	23 6	20 0	21 5	43½	42 43
19	..	..	..	..	..	..	..
26	920	367	23 6	20 9	22 2	44½	44
	3,104	1,275	23 4	20 2	21 10		
Aug.							
2	1,249	850	23 6	20 6	21 7	42	42
9	1,186	637	24 0	20 0	22 2	44	42
16	1,813	990	23 6	19 6	21 8	43½	42
23	1,540	892	23 0	19 0	20 5	44½	43½ 44
30	1,440	989	23 0	18 6	20 4	44½	42
	7,228	3,858	23 5	19 2	21 1		
Sept.							
6	970	860	22 6	18 3	20 8	44	42
13	1,152	892	22 9	19 0	21 3	44	42
20	1,685	1,326	23 0	19 6	21 6	43½ 44½	42
27	1,709	1,126	23 6	20 0	21 7	44½	41
	5,516	4,204	22 11	19 2	21 3		
Oct.							
4	1,903	1,226	23 3	20 9	21 11	44½	41½
11	1,799	1,239	23 6	21 6	22 5	43½ 44½	42 43
18	1,800	1,130	23 6	20 10½	22 2	44½	42
25	976	911	24 3	22 0	23 1	44½	42
	6,478	4,506	23 6	21 7	22 4		
Nov.							
1	1,815	718	24 3	22 0	23 3	44½	42 42½
8	2,044	1,189	24 0	22 0	23 3	44½	43
15	2,083	958	24 0	21 6	22 9	44½	42
22	1,840	958	24 0	21 0	22 5	44	42
29	1,521	667	24 0	21 6	22 8	44½	43 44
	9,803	4,440	24 1	21 8	22 10		
Dec.							
6	1,720	860	23 3	21 0	22 4	44	42
13	1,680	1,026	23 6	20 0	22 6	44½	42
20	1,542	976	23 6	21 0	22 1	43 45½	42
27	1,629	398	23 0	21 0	22 0	43½ 44½	42 43
	6,571	3,260	23 3	20 11	22 3		
Result for year	87,973	42,914	23 3	19 10	21 3		

BEANS.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for	
						Highest Price.	Lowest Price.
1911						lb. lb.	lb. lb.
Jan.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.		
4	..	..	..	..	..	..	..
11	40	..	..	..	..	..	..
18	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..
	40	..	..	..	..		
Feb.							
1	..	..	..	..	..	..	..
8	15	..	..	..	..	..	..
15	15	..	..	..	..	..	..
22	..	..	..	..	..	..	..
	30	..	..	..	..		
March							
1	25	..	..	..	..	..	..
8	125	18	34 0	32 0	32 4	63	63
15	92	1	33 0	..	33 0	64	..
22	35	5	31 0	..	31 0	64	..
29	25	10	32 0	..	32 0	64	..
	802	34	32 1	32 0	32 1		
April							
5	55	55	32 0	31 0	31 5	64	63
12	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..
	55	55	32 0	31 0	31 5		
May							
3	15	15	31 6	..	31 6	63	..
10	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..
	15	15	31 6	..	31 6		
June							
7	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..
	..	..	..	..	..		
July							
5	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..
	..	..	..	..	..		
Aug.							
2	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..
	..	..	..	..	..		

BEANS—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for	
						Highest Price.	Lowest Price.
1911							
Sept.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	lb. lb.	lb lb.
6	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..
	..	..	..	..	..	..	..
	..	..	..	..	..		
Oct.							
4	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..
	..	..	..	..	..		
Nov.							
1	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..
	..	..	..	..	..		
Dec.							
6	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..
	..	..	..	..	..		
Result for year }	442	104	31 11	31 4	31 8		

PRICES OF SHEEP SINCE 1818.

TABLE No. 1.—CHEVIOT SHEEP.

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	28 0	to 30 0	not quoted.		8 0	to 10 0
1819	25 0	" 27 0	15 0	to 17 0	10 6	" 12 0
1820	20 0	" 25 0	16 0	" 17 0	10 0	" 11 0
1821	18 0	" 20 0	14 0	" 16 0	7 6	" 8 0
1822	12 6	" 13 0	8 0	" 8 6	4 6	" 0 0
1823	13 6	" 18 0	7 0	" 10 6	5 6	" 6 0
1824	14 0	" 19 0	7 0	" 9 0	4 6	" 6 0
1825	29 0	" 32 0	15 0	" 19 0	9 0	" 10 6
1826	17 6	" 21 6	18 0	" 15 0	7 0	" 7 6
1827	15 0	" 24 0	not quoted.		7 0	" 8 0
1828	18 0	" 27 6	12 0	to 15 0	7 0	" 8 3
1829	18 0	" 24 0	12 6	" 14 0	7 0	" 8 6
1830	15 0	" 21 0	8 0	" 11 0	6 0	" 6 9
1831	18 0	" 25 0	9 0	" 13 0	7 0	" 8 0
1832	19 0	" 24 0	11 0	" 16 0	7 0	" 9 0
1833	22 0	" 31 0	13 6	" 20 0	8 0	" 11 3
1834	22 0	" 31 0	13 6	" 21 0	9 0	" 11 6
1835	22 0	" 27 6	18 0	" 20 6	8 0	" 11 0
1836	24 0	" 31 6	16 0	" 19 0	10 0	" 14 0
1837	19 0	" 28 0	14 0	" 19 0	10 0	" 13 0
1838	23 0	" 30 6	17 0	" 22 0	12 0	" 14 0
1839	23 0	" 31 0	14 0	" 19 0	0 0	" 13 0
1840	24 0	" 33 0	15 0	" 23 0	7 0	" 11 6
1841	23 0	" 30 0	14 0	" 22 0	8 0	" 12 0
1842	22 6	" 28 0	13 0	" 17 0	7 6	" 10 0
1843	19 0	" 25 0	8 0	" 12 0	5 0	" 8 0
1844	21 0	" 29 0	10 0	" 16 0	8 0	" 10 6
1845	23 0	" 33 0	13 0	" 20 0	8 0	" 13 0
1846	24 0	" 33 6	14 6	" 21 6	10 0	" 14 6
1847	24 0	" 35 0	13 0	" 24 0	11 6	" 15 0
1848	23 0	" 34 6	13 0	" 28 0	11 6	" 15 0
1849	21 0	" 30 2	12 0	" 21 0	0 0	" 14 0
1850	20 6	" 29 6	12 0	" 20 0	8 0	" 13 0
1851	21 6	" 31 0	13 0	" 21 0	8 9	" 14 0
1852	21 0	" 32 0	15 0	" 23 0	8 0	" 14 0
1853	26 0	" 38 0	17 0	" 28 6	9 0	" 17 0
1854	25 0	" 36 0	17 0	" 26 0	9 0	" 16 6
1855	23 6	" 36 0	16 0	" 25 0	10 0	" 17 0
1856	22 0	" 35 6	15 6	" 24 0	10 0	" 15 0
1857	24 0	" 36 0	14 6	" 26 0	10 6	" 14 6
1858	24 0	" 34 6	14 0	" 24 6	10 6	" 14 0
1859	25 0	" 34 6	16 0	" 25 0	10 8	" 14 9
1860	26 0	" 35 0	17 6	" 27 6	12 6	" 17 6
1861	25 0	" 33 6	16 0	" 28 0	9 0	" 16 0
1862	27 0	" 37 6	17 6	" 28 0	10 0	" 16 0
1863	25 0	" 38 6	19 0	" 28 6	10 6	" 16 0
1864	31 0	" 41 0	21 0	" 31 6	14 0	" 18 0
1865	32 6	" 44 0	22 6	" 38 6	14 6	" 20 0
1866	37 0	" 50 0	29 0	" 42 6	15 0	" 26 0
1867	26 0	" 58 0	18 0	" 25 6	12 0	" 16 0
1868	30 0	" 32 0	15 6	" 21 0	7 6	" 13 0
1869	28 0	" 38 0	15 0	" 22 6	7 6	" 14 0
1870	35 6	" 43 0	18 0	" 28 0	10 0	" 17 0
1871	36 6	" 49 0	22 0	" 38 6	14 0	" 20 0
1872	45 0	" 56 0	32 0	" 42 0	16 0	" 22 0
1873	42 0	" 51 0	25 0	" 42 0	15 6	" 22 0
1874	33 6	" 44 6	21 0	" 36 0	12 0	" 17 0
1875	33 0	" 48 6	21 0	" 34 0	13 6	" 23 6
1876	40 0	" 52 6	23 0	" 30 0	18 6	" 25 0
1877	41 0	" 51 0	25 0	" 37 0	15 0	" 24 0
1878	35 6	" 48 0	23 6	" 35 0	14 0	" 22 0
1879	34 0	" 44 0	21 0	" 34 0	14 0	" 20 0
1880	30 0	" 43 6	20 0	" 30 0	12 6	" 20 0
1881	32 0	" 45 6	29 0	" 34 0	14 0	" 20 0
1882	40 0	" 51 0	30 0	" 40 0	14 0	" 20 6
1883	44 0	" 55 6	34 6	" 46 6	15 6	" 23 0
1884	36 0	" 47 6	29 6	" 41 6	12 6	" 20 0
1885	30 0	" 38 0	24 0	" 31 0	12 0	" 15 0
1886	32 0	" 40 0	21 0	" 29 0	12 6	" 19 0

TABLE NO. 1.—CHEVIOT SHEEP—*Continued.*

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1887	29 0	to 36 0	18 0	to 26 0	11 0	to 16 6
1888	30 0	" 38 0	19 0	" 27 0	12 0	" 17 6
1889	36 0	" 44 0	24 0	" 32 0	14 0	" 22 0
1890	31 0	" 40 0	22 0	" 30 0	12 6	" 20 0
1891	27 0	" 38 0	16 0	" 25 0	9 0	" 16 0
1892	22 0	" 30 6	13 0	" 22 0	5 0	" 11 0
1893	26 0	" 35 6	18 0	" 28 6	8 6	" 15 0
1894	26 0	" 37 0	20 0	" 31 0	10 6	" 18 6
1895	28 0	" 39 0	22 0	" 34 0	11 6	" 19 6
1896	24 6	" 34 0	19 0	" 30 6	9 0	" 16 6
1897	27 0	" 36 0	21 0	" 31 6	11 0	" 17 6
1898	27 0	" 37 0	22 0	" 32 6	12 0	" 18 6
1899	24 0	" 35 0	20 0	" 30 6	10 6	" 16 0
1900	26 0	" 36 0	22 0	" 32 6	12 0	" 17 0
1901	25 0	" 32 6	20 0	" 29 6	11 0	" 16 0
1902	24 0	" 31 6	18 0	" 27 0	9 6	" 14 6
1903	26 0	" 34 0	21 0	" 31 0	11 4	" 18 0
1904	28 6	" 36 6	23 0	" 32 6	13 0	" 20 0
1905	27 6	" 35 0	23 0	" 33 0	14 0	" 21 0
1906	30 0	" 38 0	26 0	" 34 6	15 0	" 23 0
1907	28 0	" 34 0	22 0	" 30 6	13 6	" 19 6
1908	26 0	" 32 6	21 0	" 27 6	11 6	" 17 0
1909	24 0	" 31 0	18 0	" 25 6	9 6	" 16 0
1910	27 0	" 35 0	22 0	" 31 0	12 0	" 20 0
1911	24 0	" 31 6	18 6	" 27 6	10 6	" 18 0

TABLE NO. 2.—BLACKFACE SHEEP.

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1819	22 0	to 24 0	12 0	to 15 0	8 0	to 9 0
1820	20 0	" 23 3	15 6	" 17 0	7 0	" 8 6
1821	18 0	" 20 0	12 0	" 13 0	6 0	" 7 0
1822	11 6	" 13 6	5 6	" 6 0	4 6	" 0 0
1823	12 0	" 16 0	5 0	" 6 6	4 0	" 5 3
1824	9 6	" 13 6	6 0	" 7 0	4 0	" 5 0
1825	22 0	" 26 0	11 0	" 13 6	6 0	" 9 0
1826	15 0	" 17 0	8 0	" 9 0	4 6	" 6 0
1827	14 0	" 18 6	7 0	" 10 0	6 0	" 7 6
1828	15 0	" 20 0	8 0	" 11 0	5 0	" 7 6
1829	14 0	" 18 0	9 0	" 10 0	6 0	" 7 0
1830	9 6	" 13 0	4 0	" 6 0	4 6	" 6 0
1831	13 0	" 17 0	5 0	" 7 6	5 0	" 6 6
1832	14 0	" 18 0	7 0	" 11 6	6 0	" 7 8
1833	16 0	" 24 0	7 6	" 12 0	6 6	" 9 0
1834	16 0	" 22 0	10 0	" 13 0	6 0	" 8 6
1835	15 0	" 18 9	10 0	" 13 0	7 0	" 8 0
1836	15 0	" 21 0	9 0	" 12 0	8 6	" 11 0
1837	13 0	" 16 0	8 0	" 12 0	8 0	" 9 6
1838	15 0	" 20 6	10 0	" 13 0	not quoted.	
1839	15 0	" 22 0	10 0	" 12 0	7 0	to 8 3
1840	15 0	" 22 6	11 0	" 12 0	7 0	" 9 3
1841	16 0	" 20 0	9 0	" 11 0	6 0	" 8 0
1842	14 0	" 19 0	7 6	" 8 0	5 6	" 7 0
1843	not quoted.		4 9	" 6 6	not quoted.	
1844	15 0	to 21 0	6 6	" 10 0	5 0	to 8 0
1845	14 0	" 23 0	8 0	" 12 0	6 0	" 8 0
1846	13 0	" 24 0	10 0	" 13 0	8 0	" 9 0
1847	20 6	" 25 0	10 0	" 14 0	8 6	" 9 6
1848	20 0	" 24 0	11 8	" 12 0	8 6	" 10 0
1849	not quoted.		not quoted.		7 0	" 7 6
1850	..		..		7 0	" 0 0
1851	17 6	to 23 0	9 0	to 12 0	6 6	" 8 0
1852	18 6	" 22 0	9 6	" 12 0	4 6	" 7 9
1853	23 0	" 27 0	14 6	" 16 6	8 0	" 11 6
1854	20 0	" 26 0	11 0	" 16 6	8 0	" 10 6
1855	23 6	" 26 6	14 0	" 16 0	10 0	" 11 0
1856	17 0	" 24 0	10 0	" 20 0	7 6	" 10 0
1857	20 0	" 29 0	10 6	" 15 0	9 3	" 11 0
1858	20 0	" 27 6	9 9	" 18 9	8 3	" 10 6
1859	20 0	" 25 0	10 0	" 14 0	8 9	" 11 0
1860	21 0	" 27 3	11 0	" 16 0	10 0	" 13 6
1861	21 0	" 29 0	12 0	" 22 0	6 3	" 14 0
1862	16 9	" 27 0	12 0	" 18 8	6 0	" 12 0

TABLE NO. 2.—BLACKFACE SHEEP—*Continued.*

Year.	Wethers.		Ewes.		Lambs.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1863	20 0	to 30 6	13 0	to 16 0	8 0	to 11 6
1864	25 0	" 30 0	15 0	" 19 0	10 0	" 13 6
1865	15 6	" 32 6	15 0	" 25 0	10 0	" 17 0
1866	31 6	" 40 0	20 0	" 36 0	13 6	" 22 6
1867	20 0	" 30 6	14 0	" 22 0	7 6	" 13 6
1868	20 0	" 26 0	10 6	" 18 6	7 0	" 13 0
1869	22 0	" 28 0	11 0	" 14 0	6 9	" 9 0
1870	27 0	" 32 6	13 0	" 22 0	8 0	" 14 6
1871	23 0	" 37 0	13 0	" 23 0	11 0	" 16 3
1872	31 6	" 45 0	18 0	" 32 0	12 6	" 18 0
1873	28 0	" 39 0	16 6	" 27 0	7 0	" 16 0
1874	25 0	" 35 0	13 0	" 20 0	7 0	" 14 0
1875	26 6	" 37 6	15 0	" 21 8	9 6	" 17 6
1876	30 0	" 40 0	19 0	" 24 0	13 0	" 20 6
1877	35 0	" 38 9	18 0	" 25 0	13 6	" 23 0
1878	30 0	" 36 0	17 0	" 23 0	12 0	" 22 0
1879	25 0	" 35 9	16 0	" 24 0	10 6	" 20 0
1880	25 0	" 38 0	16 6	" 22 6	10 0	" 17 0
1881	30 0	" 39 0	15 0	" 23 0	10 0	" 15 0
1882	33 0	" 46 0	20 0	" 28 0	12 6	" 18 6
1883	36 0	" 50 6	24 6	" 38 0	14 0	" 21 6
1884	29 0	" 43 6	19 6	" 28 0	12 0	" 19 6
1885	24 0	" 34 0	13 0	" 22 6	10 0	" 15 0
1886	25 0	" 34 0	12 0	" 22 0	10 6	" 16 0
1887	22 0	" 30 0	11 0	" 19 0	8 0	" 13 0
1888	22 0	" 32 0	13 0	" 24 0	10 0	" 15 0
1889	26 0	" 40 0	18 0	" 29 0	13 0	" 22 0
1890	24 0	" 37 0	14 0	" 27 0	10 6	" 19 0
1891	21 0	" 37 0	10 0	" 24 0	7 6	" 15 0
1892	16 0	" 28 6	6 0	" 17 0	3 0	" 10 0
1893	21 0	" 37 0	12 0	" 24 0	7 0	" 14 6
1894	20 0	" 37 6	14 6	" 26 6	8 6	" 16 0
1895	23 0	" 41 0	16 0	" 28 6	9 0	" 17 0
1896	19 0	" 35 4	13 0	" 24 0	6 0	" 13 6
1897	21 0	" 36 6	15 0	" 25 6	7 0	" 14 6
1898	22 0	" 37 0	16 0	" 26 6	8 0	" 15 0
1899	20 0	" 33 6	13 0	" 24 0	5 6	" 13 0
1900	23 0	" 36 0	16 0	" 26 6	8 0	" 15 6
1901	20 0	" 35 0	14 0	" 25 6	6 6	" 14 6
1902	18 6	" 34 0	12 0	" 24 0	6 0	" 14 0
1903	21 0	" 36 0	15 0	" 28 0	7 0	" 16 6
1904	23 0	" 38 6	18 0	" 30 0	8 6	" 17 6
1905	21 6	" 37 0	19 0	" 31 0	9 0	" 18 6
1906	23 0	" 38 0	20 0	" 33 0	10 0	" 19 6
1907	21 0	" 33 6	17 0	" 28 0	8 6	" 17 6
1908	19 6	" 30 0	15 0	" 24 6	8 0	" 16 0
1909	17 0	" 28 0	11 6	" 22 0	6 8	" 13 0
1910	21 0	" 32 6	16 0	" 27 6	8 0	" 17 0
1911	19 0	" 29 6	14 0	" 24 0	7 0	" 15 0

TABLE NO. 3.—PRICE OF WOOL, PER STONE OF 24 LB., SINCE 1818.

Year.	Laid Cheviot.		White Cheviot.		Laid Highland.		White Highland.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	40 0	to 42 2	..	..	20 0	to 22 6	..	..
1819	21 0	" 22 0	..	..	10 0	" 10 3	..	..
1820	20 0	" 22 0	..	..	9 6	" 10 0	..	..
1821	18 0	" 20 0	..	..	9 0	" 10 0	..	..
1822	12 6	" 14 6	..	..	5 0	" 6 6	..	..
1823	9 0	" 10 6	..	..	5 0	" 5 9	..	..
1824	13 6	" 15 0	..	..	6 0	" 6 3	..	..
1825	10 6	" 22 0	..	..	10 0	" 10 6	..	..
1826	11 0	" 14 0	..	..	5 0	" 5 6	..	..
1827	11 0	" 14 0	..	..	5 6	" 6 9	..	..
1828	8 0	" 11 0	..	..	5 6	" 6 0	..	..
1829	8 6	" 11 0	..	..	4 8	" 0 0	..	..
1830	9 6	" 11 0	..	..	4 6	" 5 0	..	..
1831	17 0	" 20 0	..	..	7 6	" 8 6	..	..
1832	14 0	" 16 0	..	..	7 0	" 7 6	..	..
1833	18 0	" 20 7	..	..	10 0	" 11 0	..	..
1834	21 0	" 24 6	..	..	5 6	" 7 0	..	..
1835	19 0	" 20 6	..	..	9 6	" 10 8	..	..
1836	21 0	" 25 0	..	..	10 0	" 14 0	..	..
1837	12 0	" 14 0	..	..	7 0	" 7 8	..	..

TABLE NO. 3.—PRICE OF WOOL—Continued.

Year.	Laid Cheviot.		White Cheviot.		Laid Highland.		White Highland.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1888	19 0	to 22 6	..	..	6 0	to 10 0	..	..
1889	18 0	" 20 0	..	..	8 0	" 12 0	..	..
1890	15 0	" 0 0	..	..	7 0	" 0 0	..	..
1891	15 0	" 16 9	..	..	6 0	" 7 5	..	..
1892	12 6	" 14 0	..	..	not quoted.		..	..
1893	9 0	" 11 6	..	..	5 0	to 6 0	..	..
1894	15 0	" 18 0	..	..	not quoted.		..	..
1895	14 6	" 17 6	..	..	7 6	to 8 6	..	..
1896	12 0	" 14 6	..	..	8 0	" 8 6	..	..
1897	12 6	" 14 0	..	..	not quoted.		..	..
1898	9 6	" 11 0	..	..	4 9	to 0 0	..	..
1899	12 0	" 16 6	..	..	6 0	" 6 3	..	..
1890	15 0	" 17 6	..	..	8 0	" 8 6	..	..
1891	12 0	" 16 0	..	..	8 0	" 9 3	..	..
1892	18 0	" 15 0	..	..	8 0	" 9 0	..	..
1893	19 0	" 22 0	..	..	11 0	" 12 6	..	..
1894	12 0	" 15 0	..	..	7 6	" 8 6	..	..
1895	14 6	" 19 0	..	..	8 6	" 9 0	..	..
1896	19 0	" 21 6	..	..	11 0	" 0 0	..	..
1897	19 0	" 24 0	..	..	13 0	" 14 3	..	..
1898	15 0	" 17 0	..	..	8 9	" 10 0	..	..
1899	18 6	" 24 0	..	..	10 9	" 11 6	..	..
1890	22 0	" 32 0	37 0	to 38 0	10 0	" 11 3	..	..
1891	19 6	" 27 0	from 80s. upwards		not quoted.		..	..
1892	18 6	" 26 0	30 0	to 37 0	11 6	to 16 0	..	..
1893	25 6	" 31 0	38 0	" 42 0	15 3	" 17 6	..	..
1894	31 0	" 39 0	47 0	" 54 0	17 6	" 20 0	..	..
1895	23 0	" 30 0	44 0	" 45 0	15 0	" 17 0	..	..
1896	24 0	" 30 0	80 0	" 38 0	14 0	" 16 0	..	..
1897	16 0	" 21 6	not quoted.		not quoted.		..	..
1898	19 0	" 26 0	28 0	to 32 0	8 6	to 9 0	..	..
1899	18 0	" 26 6	not quoted.		8 6	" 10 0	..	..
1890	15 0	" 23 6	25 0	to 26 0	9 6	" 0 0	..	..
1891	20 0	" 26 6	30 0	" 34 6	12 0	" 15 0	..	..
1892	26 0	" 37 6	40 0	" 48 0	18 0	" 21 0	..	..
1893	17 0	" 18 0	34 0	" 40 0	9 0	" 12 0	..	..
1894	18 6	" 26 6	30 0	" 34 0	9 6	" 13 0	..	..
1895	25 0	" 32 0	34 6	" 36 0	12 6	" 16 0	..	..
1896	20 0	" 24 0	30 0	" 34 6	9 6	" 12 0	..	..
1897	20 9	" 26 0	28 0	" 30 0	10 0	" 12 0	..	..
1898	18 9	" 25 0	27 0	" 32 0	8 6	" 11 6	..	..
1899	15 0	" 17 0	prices very low.		7 0	" 0 0	..	..
1890	20 0	" 24 0	30 0	to 32 0	10 6	" 11 6	14 0	to 15 0
1891	17 0	" 21 0	27 0	" 30 0	5 0	" 9 6	12 0	" 13 0
1892	14 0	" 18 0	27 6	" 28 0	7 6	" 9 0	13 0	" 14 0
1893	18 0	" 18 0	26 0	" 28 0	6 6	" 8 6	11 6	" 12 6
1894	18 0	" 18 0	26 0	" 28 0	6 6	" 8 6	11 6	" 12 6
1895	12 0	" 17 0	22 6	" 26 0	6 0	" 8 0	11 6	" 12 0
1896	13 0	" 18 0	23 0	" 27 6	6 6	" 8 6	11 6	" 12 0
1897	14 0	" 22 0	23 0	" 28 0	7 0	" 9 0	11 6	" 13 0
1898	13 0	" 20 0	23 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1899	13 0	" 18 0	24 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1890	13 0	" 18 0	24 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1891	12 6	" 18 0	22 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1892	12 0	" 18 0	20 0	" 28 0	7 0	" 8 6	10 6	" 12 0
1893	12 0	" 17 0	20 0	" 27 0	7 0	" 8 0	10 0	" 12 0
1894	12 0	" 16 0	20 0	" 26 0	7 0	" 8 0	10 0	" 12 0
1895	12 0	" 16 0	20 0	" 25 0	7 0	" 8 0	10 0	" 11 6
1896	11 0	" 15 0	19 0	" 24 0	7 0	" 8 0	10 0	" 11 6
1897	11 0	" 14 0	18 0	" 23 0	7 0	" 8 0	10 6	" 12 0
1898	10 0	" 13 0	16 0	" 20 0	7 0	" 8 0	10 0	" 11 6
1899	10 0	" 13 0	18 0	" 18 6	7 0	" 8 0	8 6	" 9 6
1900	9 9	" 12 0	18 0	" 18 6	6 9	" 7 9	8 0	" 9 6
1901	9 0	" 10 0	11 0	" 16 6	5 9	" 6 6	8 0	" 9 0
1902	9 0	" 10 0	11 6	" 17 0	6 0	" 6 6	8 6	" 9 6
1903	10 0	" 12 0	15 0	" 18 0	7 0	" 8 0	11 6	" 12 6
1904	15 0	" 17 0	20 0	" 21 0	9 0	" 10 0	14 0	" 15 0
1905	17 0	" 20 0	24 0	" 26 0	10 0	" 11 0	15 0	" 16 0
1906	18 0	" 21 0	27 6	" 28 6	11 6	" 13 0	16 6	" 17 6
1907	..	" ..	22 0	" 24 0	11 0	" 12 6	16 0	" 17 0
1908	..	" ..	16 0	" 18 0	†	" ..	8 0	" 8 6
1909	..	" ..	24 0	" 26 0	†	" ..	12 6	" 14 0
1910	..	" ..	25 0	" 30 0	†	" ..	13 0	" 14 6
1911	..	" ..	26 0	" 30 0	†	" ..	13 0	" 14 6

* No Cheviots smeared now.

† No Highlands smeared now.

GENERAL SHOW AT INVERNESS, 1911.

THE eighty-fourth Show of the Society and the tenth at Inverness opened on Tuesday, 25th July, under favourable weather conditions. With the exception of a sharp shower or two towards noon, the day turned out fine and warm, with a gentle breath of wind; and the Judging, on the whole, was carried through expeditiously and without any discomfort to speak of.

Delightful weather prevailed during the following three days of the Show. The attendance of visitors was large, considering the sparseness of the population in the district.

In the beautifully situated Victoria Park, at the base of the wooded hill of Tomnahurich, the town of Inverness provided an excellent site for the Showyard. The town also gave a plentiful supply of water free of charge, contributed fifty guineas to the local fund, and along with the County Committees and local Agricultural Associations co-operated most heartily with the Society in promoting the success of the Show.

The County Councils of Inverness, Ross and Cromarty, Caithness, and Nairn contributed handsomely to the Show funds by means of voluntary assessments on owners of lands and heritages.

The Highland Railway Company gave a donation of £50. Several local Agricultural Societies also generously subscribed.

Considering the large amount of extra expenses connected with the holding of the Show at Inverness, a place so far removed from the populous centres of industry and in a district with a diminishing rural population, it is not to be wondered at that the accounts show a deficiency of about £260.

A noteworthy feature of the Show was the fine display of live stock. The cattle entries were numerous, and the quality of a high standard. The classes for horses were very well filled, and in several the quality has seldom been equalled. Sheep were well represented in all the breeds, and were of high merit. The collection of the most improved farm implements and machines was large for the district, and a fair amount of business was transacted in this department.

Statistics.

The following tables give the number of entries in the various sections :—

1. CATTLE.

Class.	SHORTHORN.	No. of Entries.
1. Aged bulls		12
2. Two-year-old bulls		18
3. One-year-old bulls		14
4. Cows of any age		12
5. Two-year-old heifers		11
6. One-year-old heifers		24
		— 91
	ABERDEEN-ANGUS.	
7. Aged bulls		10
Extra Stock		1
8. Two-year-old bulls		7
9. One-year-old bulls		11
10. Cows of any age		8
11. Two-year-old heifers		10
12. One-year-old heifers		23
		— 70
	GALLOWAY.	
13. Aged bulls		2
14. Two-year-old bulls		3
15. One-year-old bulls		4
16. Cows of any age		5
Extra stock		1
17. Two-year-old heifers		6
18. One-year-old heifers		10
		— 31
	HIGHLAND.	
19. Aged bulls		7
20. Two-year-old bulls		5
21. One-year-old bulls		13
22. Cows of any age		11
23. Three-year-old heifers		12
24. Two-year-old heifers		17
		— 65
	AYRSHIRE.	
25. Aged bulls		3
26. Two-year-old bulls		2
27. One-year-old bulls		5
28. Cows in milk, calved before 1908		4
29. Cows of any age, in calf, or heifers calved in 1908, in calf, and due to calve within nine months after the Show		5
30. Two-year-old heifers, in calf, and due to calve not sooner than 1st September nor later than 31st December 1911		3
31. Two-year-old heifers		3
32. One-year-old heifers		4
		— 29
	FAT CATTLE.	
33. Two-year-old oxen, any pure breed or cross		7
34. One-year-old oxen, any pure breed or cross		7
35. Two-year-old heifers, any pure breed or cross		2
36. One-year-old heifers, any pure breed or cross		6
		— 22
		308

2. HORSES.

DRAUGHT STALLIONS.

37. Aged stallions	13
38. Three-year-old entire colts	14
39. Two-year-old entire colts	25
40. One-year-old entire colts	18
	— 70

DRAUGHT GELDINGS.

41. Aged geldings	5
42. Three-year-old geldings	7
43. Two-year-old geldings	3
	— 15

DRAUGHT MARES AND FILLIES.

44. Mares with foal at foot	9
45. Yeld mares, foaled before 1908	8
Extra stock	1
46. Three-year-old yeld mares, or fillies	11
47. Two-year-old fillies	11
48. One-year-old fillies	16
	— 56

HUNTERS.

49. Colts, geldings, or fillies, foaled in 1910, the produce of thoroughbred stallions out of mares of any breed	9
50. Fillies, mares, or geldings, for field, foaled in 1909	5
51. Yeld mare, filly, or gelding, for field, foaled in 1908	1
52. Hunter brood mares, with foal at foot	5
	— 20

HACKNEYS.

53. Brood mare, 14 hands and over, with foal at foot, or to foal this season to a registered sire	2
54. Yeld mares or fillies, three years old	2
Extra stock	1
55. Stallions, 3 years old and upwards, 14 hands and over	3
	— 8

PONIES.

56. Stallions, 3 years old and upwards, 14 hands and under	4
57. Yeld mares, fillies, or geldings, 3 years old and upwards, over 13 and not over 14 hands	4
58. Yeld mare, filly, or gelding, 3 years old and upwards, over 12 and not over 13 hands	1
59. Yeld mares, fillies, or geldings, 3 years old and upwards, 12 hands and under	2
	— 11

HIGHLAND PONIES.

60. Stallions of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony section of the Polo Pony Stud-Book	4
61. Stallions of the light type, 3 years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony section of the Polo Pony Stud-Book	3
Extra stock	2
62. Mares of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, yeld or with foal at foot, entered or accepted for entry in the Highland Pony section of the Polo Pony Stud-Book	13
Extra stock	1
63. Mares of the light type, 3 years old or upwards, not exceeding 14.2 hands, yeld or with foal at foot, entered or accepted for entry in the Highland Pony section of the Polo Pony Stud-Book	23
	— 46

SHETLAND PONIES.

64. Stallions, not exceeding 10½ hands, foaled before 1908 . . .	8
Extra stock	1
65. Entire colts, not exceeding 10½ hands, foaled in 1908 or 1909 . . .	8
66. Mares, not exceeding 10½ hands, with foal at foot . . .	14
Extra stock	2
67. Yeld mares, not exceeding 10½ hands	6
68. Fillies, not exceeding 10½ hands, foaled in 1908 or 1909 . . .	6
—	45

DRIVING COMPETITIONS.

69. Yeld mares, fillies, or geldings, any age, in harness, 15 hands and upwards (3)	2
70. Yeld mares, fillies, or geldings, any age, in harness, under 15 hands (4)	2
—	4
	<u>275</u>

JUMPING.

1. Horses or ponies, any height	11
2. Horses or ponies, any height—handicap	8
3. Horses or ponies, any height—handicap	8
—	27

3. SHEEP.

BLACKFACE.

71. Tups above one shear	10
72. Shearling tups	21
73. Ewes above one shear, with lambs	7
74. Shearling ewes or gimmers	8
75. Shearling tups, clipped on or after 1st March 1911	11
—	57

CHEVIOT.

76. Tups above one shear	11
77. Shearling tups	11
78. Ewes above one shear, with lambs	9
79. Shearling ewes or gimmers	13
—	44

BORDER LEICESTER.

80. Tups above one shear	6
81. Shearling tups	28
82. Ewes above one shear	9
83. Shearling ewes or gimmers	22
—	65

HALF-BRED.

84. Tups above one shear	2
85. Shearling tups	7
86. Ewes above one shear	6
87. Shearling ewes or gimmers	7
—	22

SHROPSHIRE.

88. Shearling tups	4
Extra stock	1
89. Shearling ewes or gimmers	3
Extra stock	3
—	11

OXFORD DOWN.

90. Shearling tups	8
Extra stock	1
91. Shearling ewes or gimmers	4
—	13

SUFFOLK.

92. Shearling tups	3
93. Shearling ewes or gimmers	4
94. Tup lambs	3
95. Three ewe lambs	4
	14

EXTRA SECTIONS.

96. Three fat lambs, any breed or cross	7
Extra stock	4
	11
	237

4. SWINE.

LARGE WHITE BREED.

97. Boars farrowed before 1910	6
98. Boars farrowed in 1910	5
99. Boars farrowed in 1911	11
100. Sows farrowed before 1910	7
101. Sows farrowed in 1910	8
102. Sows farrowed in 1911	13
	50

BERKSHIRE.

103. Boars, any age	2
104. Boars farrowed in 1911	4
105. Sows, any age	4
106. Sows farrowed in 1911	4
	14
	64

5. POULTRY.

1-98. Poultry	474
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6. DAIRY PRODUCE.

1. Powdered butter, not less than 7 lb.	11
2. Fresh butter, 3 1-lb. rolls	13
3. Cheddar cheese, 56 lb. and upwards	12
4. Sweet-milk cheese, flat shape, white in colour, made according to the Dunlop or other method	5
	41

ABSTRACT.

	No. of Entries.
1. Cattle	308
2. Horses	275
3. Sheep	237
4. Swine	64
5. Poultry	474
6. Dairy produce	41

The following table gives a comparative view of the display of cattle, horses, sheep, swine, poultry, dairy produce, and implements, of the value of the premiums offered, and of the receipts at the entrance-gates, grand stands, and for catalogues at the Shows which have been held at Inverness:—

Year.	Cattle.	Horses.	Sheep.	Wool.	Swine.	Poultry.	Dairy Produce.	Implements.	Premiums.	Drawings at Show.
1831 .	198	77	36	...	11	...	...	4	£318	£71
1839 .	302	93	126	...	32	...	...	24	744	211
1846 .	428	112	125	...	23	37	23	59	1050	254
1856 .	248	131	204	...	31	52	...	231	1000	315
1865 .	361	132	317	...	30	98	...	707	1300	920
1874 .	391	175	192	...	38	328	...	1161	2030	1120
1883 .	354	172	175	...	19	303	...	1280	1978	1295
1892 .	255	218	201	...	8	229	29	1381	2056	1750
1901 .	360	257	204	22	22	499	42	1463	2806	2476
1911 .	308	275	237	...	64	474	41	1513	2870	2550

A Comparison.

The following figures relating to some of the most successful Shows the Society has held, will be perused with interest:—

	Cattle.	Horses.	Sheep.	Swine.	Poultry.	Total Live Stock.	Implements.	Premiums.	Drawings at Show.	Profit.
Glasgow, 1867 .	286	212	257	58	150	963	1344	£1600	£3,005	£1307
Edinburgh, 1869 .	310	212	340	22	239	1123	1900	1600	4,078	2067
Glasgow, 1875 .	411	405	296	48	479	1639	2220	2665	6,231	3316
Edinburgh, 1877 .	339	342	305	30	234	1250	2292	2714	6,784	3710
Edinburgh, 1884 .	580	453	493	35	253	1814	2282	4343	6,548	1855
Edinburgh, 1893 .	380	349	294	31	360	1414	2268	2600	4,918	2323
Aberdeen, 1894 .	314	324	184	34	365	1221	2532	2440	5,121	1678
Perth, 1896 .	292	258	204	20	374	1148	1945	2205	4,788	2511
Glasgow, 1897 .	317	350	245	30	275	1217	2227	2897	4,392	2021
Edinburgh, 1899 .	386	518	477	46	551	1978	2585	3844	10,285	3911
Stirling, 1900 .	321	288	369	28	457	1463	2095	2915	4,305	1078
Inverness, 1901 .	360	257	204	22	499	1340	1460	2806	2,485	99
Aberdeen, 1902 .	330	253	243	42	475	1343	1988	2796	4,413	1604
Perth, 1904 .	348	315	283	35	413	1394	1972	3058	4,993	1828
Glasgow, 1905 .	310	462	284	60	534	1750	1875	3702	4,473	1203
Peebles, 1906 .	253	258	291	40	438	1280	1658	3072	2,596	416
Edinburgh, 1907 .	363	464	352	58	605	1842	2140	3614	7,061	2309
Aberdeen, 1908 .	331	299	237	42	509	1418	1931	3045	4,596	1881
Stirling, 1909 .	330	355	249	54	539	1527	1977	3017	4,638	1100
Dumfries, 1910 .	270	355	295	54	481	1455	1950	3057	3,411	562

Cattle.

Considering the outlying position of the Highland capital, it was highly gratifying to see such a numerous display of cattle, numbering 308 entries.

The entries of Shorthorn cattle numbered 91, some of the classes being exceptionally well filled. Disappointment was felt at the absence of His Majesty's animals from Windsor, owing to disease in that district. There were 44 entries in the three classes for bulls. Plenty of merit was well distributed over the three classes. The class for aged bulls produced the champion in the Duke of Portland's grand four-year-old roan bull, "Village Diamond" 100,981 (fig. 57), bred by W. T. Garne & Son, Aldsworth, Gloucestershire.

The two-year-old bulls made a strong display, an outstanding winner being Mr C. E. Gunther's "Tongswood Bamton" 107,295.

The classes of Shorthorn cows and heifers were all over of a high standard of merit. Captain Alex. T. Gordon, Loanhead, secured the Special Prize for the best Shorthorn female with his handsome three-year-old cow "Florrie." This cow was greatly admired. In a strong and highly meritorious class of yearling heifers, containing no fewer than 24 entries, the premier honour went to Mr C. M. Cameron, Balnakyle, for his beautifully coloured and well-proportioned heifer "Princess 20th," by "Nonpareil Gift" out of "Princess 17th."

Aberdeen-Angus cattle were not so numerous as Shorthorns. His Majesty the King was represented by several animals from the Abergeldie herd. Here again a high standard of merit was reached, all the classes showing good quality. The President's Medal for the best animal of the breed went to Mr J. Ernest Kerr of Harviestoun Castle for his unbeaten cow "Juanista Erica" 44,037, a level weighty cow of fine quality (fig. 58). She was awarded the Champion Gold Medal given by the Aberdeen-Angus Cattle Society for best animal in the breeding classes. This cow also won the Ballindalloch Challenge Cup as the best animal in her class.

The contest for the Ballindalloch Challenge Cup for the best bull resulted in the honours going over the Borders, Viscount Allendale, Bywell Hall, Northumberland, being the winner with "Elmhore" 29,122, a two-year-old bull of great quality and style, bred by his late Majesty King Edward VII. at Abergeldie Mains.

The Heifer classes included some animals of exceptional promise.

Galloway cattle were few in number, but nevertheless a few excellent specimens of the breed were among the exhibits. The

President's Medal went to Mr Robert Graham, Auchengassel, for "Our Sally" 18,674 (fig. 59), a cow of great size and style, showing the true character of the breed.

Highland cattle, as was to be expected in the home of the breed, formed one of the most attractive and most prominent features of the Show. The Championship of the breed was won for the third time in succession by the famous cow "Fuinary Queen" 7705 (fig. 60), the property of Mr Gerard Craig Sellar of Ardtornish.

As was to be expected at a Show so far distant from the stronghold of the breed, the Ayrshires made only a moderate display as to numbers. What were of them, however, showed as high a standard of excellence as could be seen anywhere. The President's Champion Medal went to Mr Robert Osborne, Morton Mains, for his stylish-looking two-year-old heifer "Morton Mains Memonas" 27,382 (fig. 61). This is a heifer of good promise, and carried off the Special Prize given by the Ayrshire Cattle Herd-Book Society for the best female animal of the breed. The Special Prize given for the best male animal was awarded to Mr Thomas Barr, Hobsland, for his one-year-old bull "Hobsland Masterpiece" 8795, a well-shaped, all-round, good bull of a white colour.

The display of Fat Cattle, though not so numerous as might be expected, was highly creditable. The Championship went to Messrs Fraser, Kennedy, & Fraser, Gollanfield Mains, for their two-year-old blue-grey ox (fig. 62).

Horses.

All the Clydesdale classes were well filled. The Clydesdale males were a magnificent sight, and for merit would hold their own with any Show the Society ever held. Mr William Dunlop, Dunure Mains, carried off the President's Champion Medal for the best Clydesdale stallion or colt with an exceptionally promising yearling brown colt "The Dunure" (fig. 63), bred by Messrs J. & T. Robertson, Clendrie, Kirkcolm, got by "Baron of Bucklyvie" 11,263, and out of "Carina II." 16,323 by "Hiawatha" 10,067.

Draught Geldings were a fairly strong show. Messrs J. & W. Meiklem, Begg, Kirkcaldy, got the President's Medal for "Harry" (fig. 64), a handsome four-year-old brown, bred by Mr Pilkington, Rainford Hall, St Helens.

The Clydesdale females were a good substantial lot, the younger classes being fairly well filled and of very good quality. For the best Clydesdale mare or filly Mr Stephen Mitchell of Boquhan won the President's Medal with his brown

mare "Boquhan Lady Peggy" (fig. 65), which won the Championship at Dumfries Show in 1910.

The turn-out of Hunters was small, as was to be expected. The President's Medal went to Miss Mary A. Dalrymple, Elliston, St Boswells, for "Lala O'Dale" 3529 (fig. 66), a well-shaped three-year-old chestnut filly of her own breeding. This filly also won the Champion Gold Medal given by the Hunters' Improvement Society.

Hackneys were very small in number, only eight having been entered. Mr Walter Briggs, Linden Hall, Carnforth, Lancashire, got the President's Champion Medal for "Albin Wildfire" 10,551 (fig. 67), a home-bred four-year-old dark-chestnut stallion.

The number of Ponies exhibited were few. Mr J. Ernest Kerr's mare "Harviestoun Rene" 19,951 (fig. 68) won the President's Medal.

Highland Ponies were a most attractive and highly popular display. The female classes were especially well filled, of desirable character and high quality. The Championship went to His Majesty the King, Birkhall, Ballater, for his dark-grey stallion "Skerryvore" 433 (fig. 69), bred by Mr J. Munro Mackenzie of Calgary, Isle of Mull.

As usual, Shetland Ponies made a pretty display, and were of all-round merit. The President's Medal in this section went to Mr William Mungall of Transy, Dunfermline, for his mare "Silver Queen" 1197 (fig. 70). Mr Mungall also won the Special Prize given by the President of the Shetland Pony Stud-Book for best group with "Silver Queen" and her progeny, "Silver Star of Transy" and "Silverton of Transy" 518.

There were only four entries in the Driving classes. The Champion Medal was won by Alex. T. Gordon, Loanhead, Inch, for his handsome four-year-old brown gelding "Rey-del-Aide" (fig. 71).

Sheep.

All the classes of Sheep were well represented, and in regard to merit were of a high standard. The winners of the President's Champion Medals are shown in figs. 72-78.

Swine.

The show of Swine was about the largest ever seen at a Highland Show. The quality was also of a high order. The Championship went to the Earl of Ellesmere, Worsley Hall, Manchester, for "Worsley Turk VI." 12,975 (fig. 79), a good typical animal of the Large White breed.

TRIAL OF POTATO DIGGERS OR LIFTERS.

A trial of Potato Diggers was held on Thursday, 5th October 1911, on the farm of Turnhouse, Cramond, kindly lent for the purpose by Mr James Stenhouse. The weather was all that could be desired, and the trial was witnessed by a large number of interested spectators, to whom a fine opportunity was afforded for closely studying the working of the several machines.

It was expressly stipulated that Diggers entered for the trial must be on entirely new principles, or possess radical improvements on machines now in use. Further, all Diggers taking part in the trial were required to have been previously exhibited at the Inverness Show, 1911.

The Society placed a sum of £50 at the disposal of the Committee, to be awarded in one or more premiums if such award should be considered merited.

The judges appointed by the Society were: Mr J. M'Hutchen Dobbie, Campend, Dalkeith; Mr George Dun, Woodmill, Auchtermuchty; Mr J. Edmond, Gallamuir, Bannockburn; Mr W. T. Malcolm, Dunmore, Larbert; and Professor Stanfield, Consulting Engineer to the Society.

Fourteen machines were originally entered for the trial by the following firms, viz.:—

J. D. Allan & Son, Murthly.

1. Potato Digger, with graip action, ordinary speed.
Price £14. Revolving Reel £1 extra.
2. Potato Digger, same as above, but with a slower speed.

Alexander Ballach & Sons, Manderston Street, Leith.

3. Mather's Patent Digger, with rotary wheels (entirely new design). Price £18.

J. Bisset & Sons, Ltd., Blairgowrie.

4. Potato Digger, with new digging forks. Price £15.

Martin's Cultivator Co., Ltd., Stamford.

5. Potato Digger, in which the share can be set to any required pitch, and the forks can be adjusted up and down, and set to any angle. Price £14.

6. Potato Digger, similar to the above, but of larger capacity, wider share, longer radius arms, and with five forks instead of four. Price £15.

Andrew Pollock, Mauchline, Ayrshire.

7. The "Perfect" Potato Digger, with graip action.
Price £15. .

Powell Brothers & Whittaker, Wrexham.

8. Potato Digger, "Cambrian," with seat, vertical fork digger, six forks fitted with hardwood handles. Price £15, 10s. Disc Weed Cutter (if required) £1 extra; Net Screen (if required) 15s. extra.

9. Potato Digger, without seat, vertical fork digger, six forks, and vertical link motion. Price £15. Extras as above.

Ransomes, Sims, & Jefferies, Ipswich.

10. Potato Digger (new), with hanging forks. Price £16, 10s.

11. Potato Digger (new), Phillips' Patent. Price £17, 10s.

George Sellar & Son, Huntly, N.B.

12. Potato Digger. Price £14.

John Wallace & Sons, Ltd., Graham Square, Glasgow.

13. Potato Digger. Price £14.

David Wilson, East Linton, Prestonkirk.

14. Potato Raiser. Price £20.

Of the above machines entered, only five took part in the trial—viz., two from J. D. Allan & Son, and one each from Andrew Pollock, J. Wallace & Sons, and David Wilson.

The soil in the upper part of the field in which the trial took place was an extremely free loam, the lower part being a little stiffer, very dry, and did not offer any serious difficulty to the machines. A transverse opening had been made across the plots, dividing them into two sections of about equal length, the lower section in each plot being reserved exclusively for the judges and officials. This arrangement worked very well, and the judges were able to carry out their duties without being embarrassed by the crowd of spectators. The crop was one of Up-to-Dates, with fairly strong "shaws." Each machine was required to lift a plot of six drills about 160 yards in length, with the shaws on, and afterwards they were tested on drills from which the shaws had been removed.

Each competitor was allowed to utilise the first two drills for purposes of adjustment, and the results from these drills were not taken into account in ascertaining the relative merits of the several machines. After the next round, at a given point on the same line in all the plots, a basketful of potatoes was collected as lifted by each machine, and counted, after which the proportion of cut and damaged potatoes was ascertained. After the potatoes in these specified drills had been gathered, the ground was turned over with a harrow, and the potatoes that had been left covered were collected and weighed.

Continued on p. 397.



Fig. 57.—SHORTHORN BULL, "VILLAGE DIAMOND" 100,981.

Winner of the President's Medal for best Shorthorn, Inverness Show, 1911. The property of The Duke of Portland, K.G., Welbeck Abbey, Worksop, Nottingham. Bred by Messrs W. T. Garne & Son, Aldsworth, Northleach, Glos. Age four years and six months.



Fig. 58.—ABERDEEN-ANGUS COW, "JUANISTA ERICA" 44,037.

Winner of the President's Medal for best Aberdeen-Angus animal, Inverness Show, 1911. Bred by and the property of Mr J. E. Kerr of Harviestoun Castle, Dollar. Age three years and four months.



Fig. 59.—GALLOWAY COW, "OUR SALLY" 18,674.

Winner of the President's Medal for best Galloway, Inverness Show, 1911. The property of Mr Robert Graham, Auchengassel, Tynholm. Bred by Mr H. B. Lane, Rush Hall, Linnavady, Ireland. Age seven years and four months.

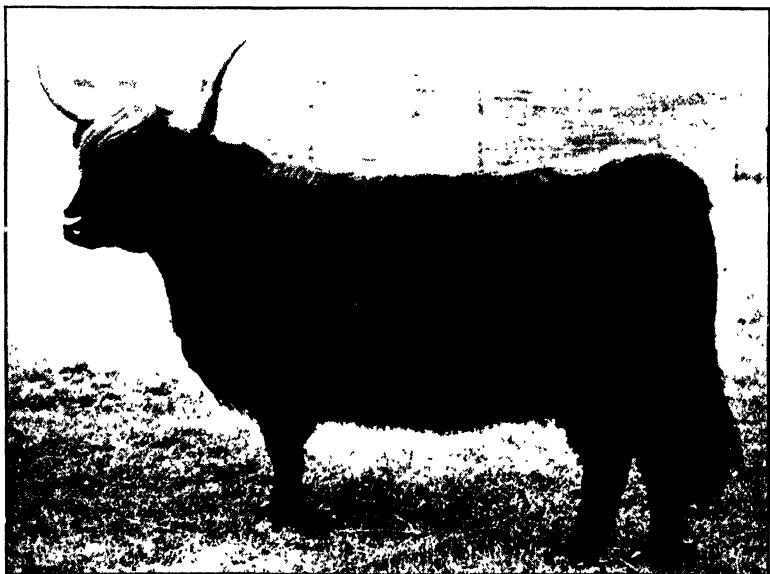


Fig. 60.—HIGHLAND COW, "FUINARY QUEEN" 7705.

Winner of the President's Medal for best Highland animal, Inverness Show, 1911. The property of Mr Gerard Craig Sellar, Ardtornish, Morvern, Argyll. Bred by Mrs Craig Sellar, Ardtornish, Morvern, Argyll. Age four years and six months.

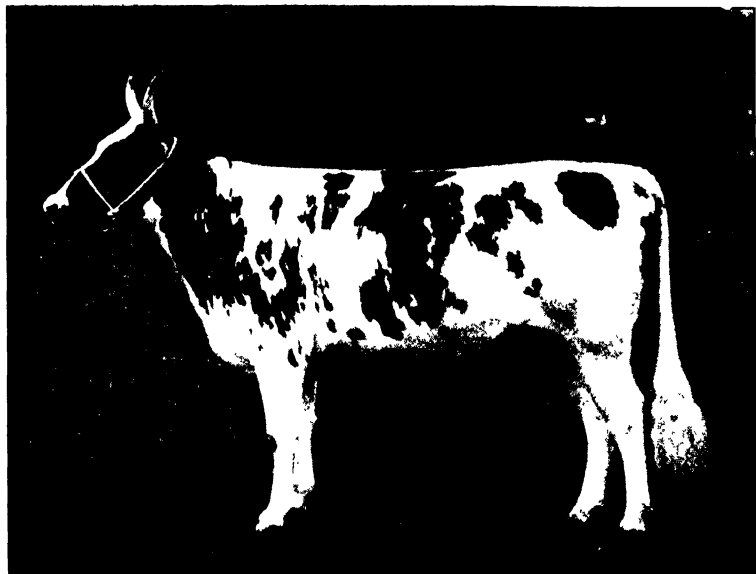


Fig. 61.—AYRSHIRE HEIFER, "MORTON MAINS MEMONAS" 27,382.

Winner of the President's Medal for best Ayrshire, Inverness Show, 1911. Bred by and the property of Mr Robert Osborne, Morton Mains, Thornhill. Age two years and five months.



Fig. 62.—CROSS OX, "GOLLANFIELD BOY."

Winner of the President's Medal for best Fat Animal, Inverness Show, 1911. The property of Messrs Fraser, Kennedy, & Fraser, Gollanfield Mains, Gollanfield. Bred by Mr James Fraser, Knockancarn, Novar, Evanton. Age two years and one month.

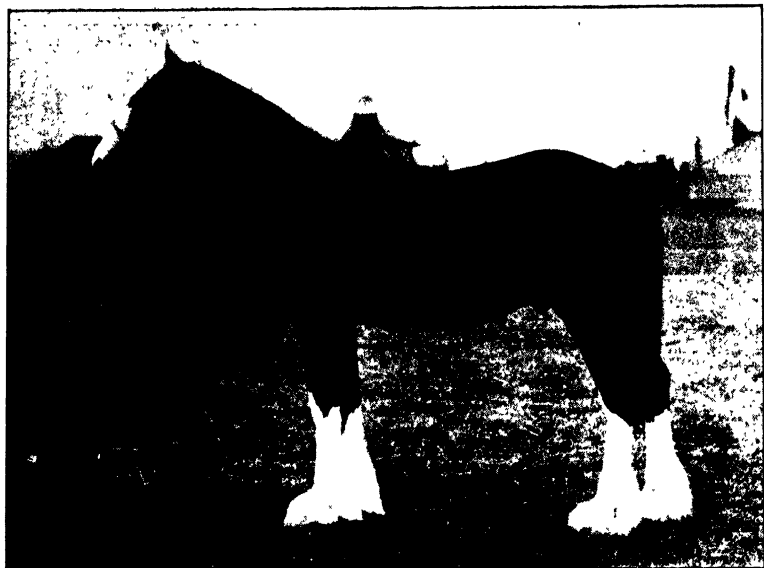


Fig. 63.—CLYDESDALE COLT, "THE DUNURE."

Winner of the President's Medal for best Clydesdale Stallion or Colt, Inverness Show, 1911. The property of Mr William Dunlop, Dunure Mains, Ayr. Bred by Messrs J. & T. Robertson, Clendrie, Kirkeolm. Age one year.

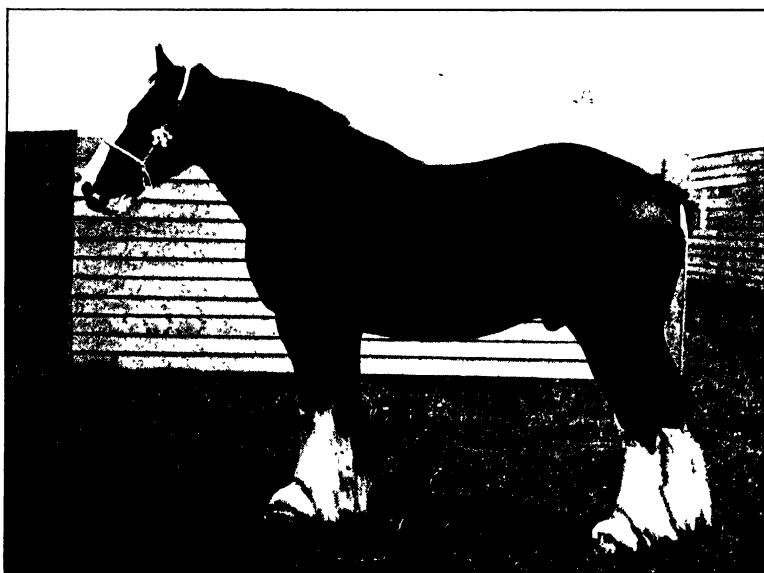


Fig. 64.—DRAUGHT GELDING, "HARRY."

Winner of the President's Medal for best Draught Gelding, Inverness Show, 1911. The property of Messrs J. & W. Meiklem, Begg, Kirkcaldy. Bred by Mr Pilkington, Rainford Hall, St Helena. Age four years.

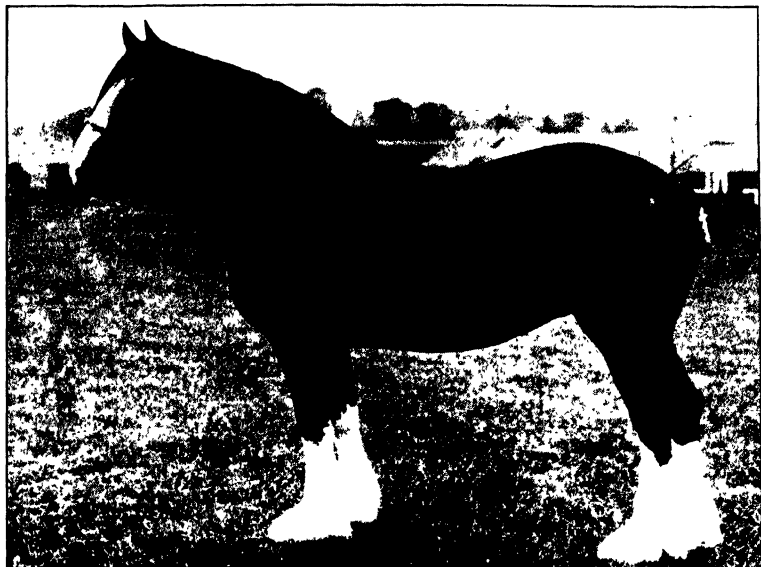


Fig. 65.—CLYDESDALE MARE, "BOQUHAN LADY PEGGY."

Winner of the President's Medal for best Clydesdale Mare or Filly, Inverness Show, 1911. The property of Mr Stephen Mitchell of Boquhan, Kippen Station. Bred by Messrs D. & J. Curr, Red House, Carlisle. Age five years and two months.

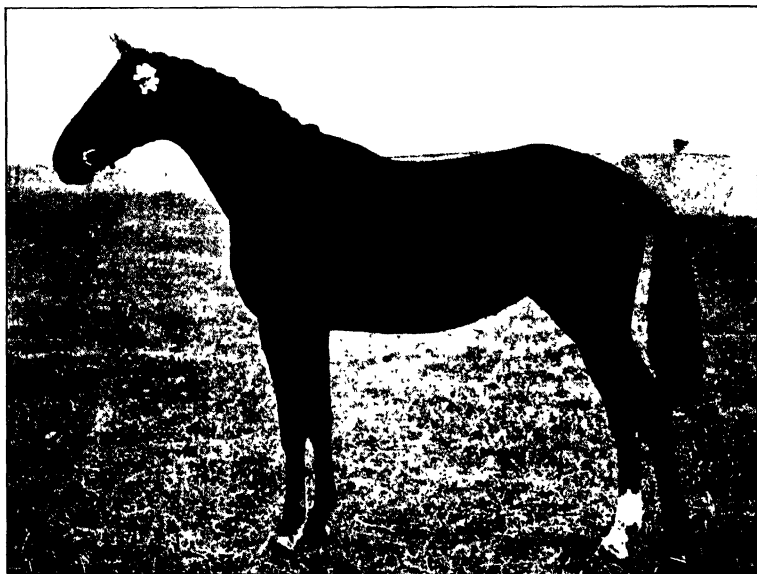


Fig. 66.—HUNTER FILLY, "LALA O'DALE" 3529.

Winner of the President's Medal for best Hunter, Inverness Show, 1911. Bred by and the property of Miss Mary A. Dalrymple, Elliston, St Boswells. Age three years and four months.

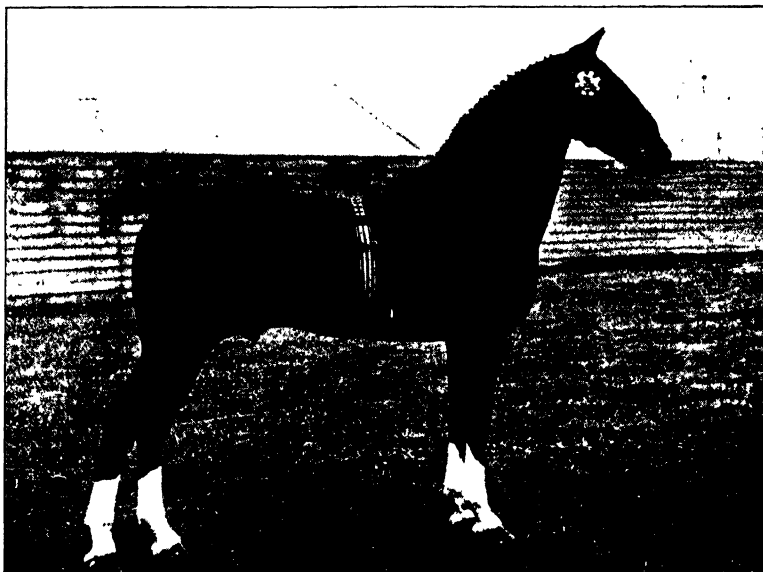


Fig. 67.—HACKNEY STALLION, "ALBIN WILDFIRE" 10,551.

Winner of the President's Medal for best Hackney, Inverness Show, 1911. Bred by and the property of Mr Walter Briggs, Linden Hall, Borwick, near Carnforth, Lancashire. Age four years.



Fig. 68.—PONY MARE, "HARVIESTOUN RENE" 19,951.

Winner of the President's Medal for best Pony, Inverness Show, 1911. Bred by and the property of Mr J. E. Kerr of Harviestoun Castle, Dollar. Age five years.



Fig. 69.—HIGHLAND PONY STALLION, "SKERRYVORE" 133.

Winner of the President's Medal for best Highland Pony, Inverness Show, 1911. The property of His Majesty the King, Birkhall, Ballater. Bred by Mr J. H. Munro Mackenzie of Calgav, Isle of Mull. Age six years.



Fig. 70.—SHETLAND PONY MARE, "SILVER QUEEN" 1197.

Winner of the President's Medal for best Shetland Pony, Inverness Show, 1911. The property of Mr William Mungall of Trausay, Dunfermline. Bred by The Marquis of Londonderry, K. G., Seaham Hall, Seaham Harbour. Age eighteen years and two months.



Fig. 71.—HACKNEY GELDING IN HARNESS, "KEY-DEL-AIDE." Winner of the President's Medal for best animal in Classes for Horses in Harness, Inverness Show, 1911. The property of Mr. Alexander T. Gordon, Loanhead, Insch. Bred by Dr. M'Gill. Age four years.

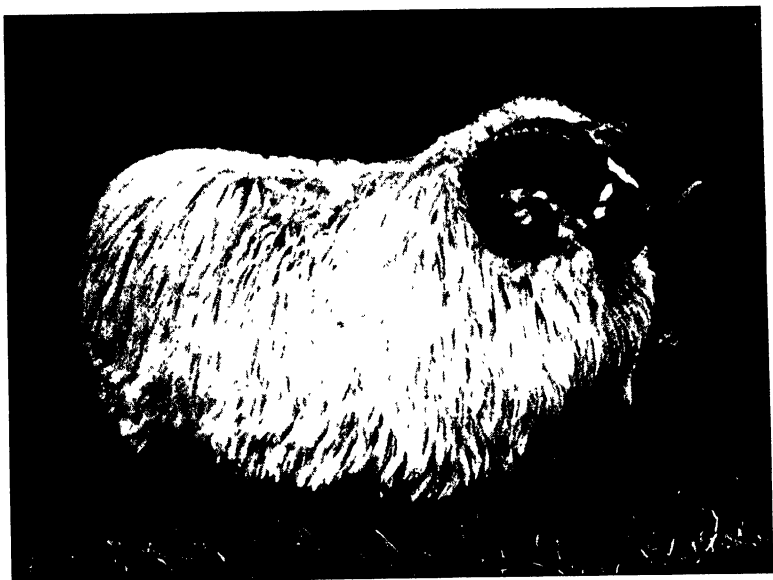


Fig. 72.—BLACKFACE SHEARLING TUP.

Winner of the President's Medal for best Blackface Sheep, Inverness Show, 1911. Bred by and the property of Mr Charles Howatson of Glenbuck.

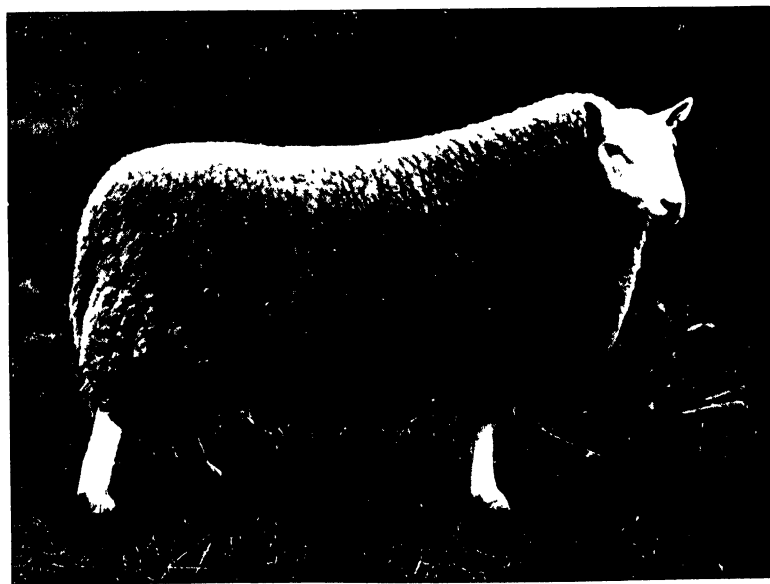


Fig. 73.—CHEVIOT SHEARLING TUP.

Winner of the President's Medal for best Cheviot Sheep, Inverness Show, 1911. Bred by and the property of Mr John Elliot, Hindhope, Jedburgh.



Fig. 74.—BORDER LEICESTER SHEARLING TUP.

Winner of the President's Medal for best Border Leicester, Inverness Show, 1911. Bred by and the property of Mr John Kinnaird, jun., Newmans, Stenton, Prestonkirk.



Fig. 75.—HALF-BRED SHEARLING TUP.

Winner of the President's Medal for best Half-Bred, Inverness Show, 1911. The property of Mr John Mark, Sunnyside, Prestonkirk. Bred by Mr John Stewart, Stoneypath, Prestonkirk.

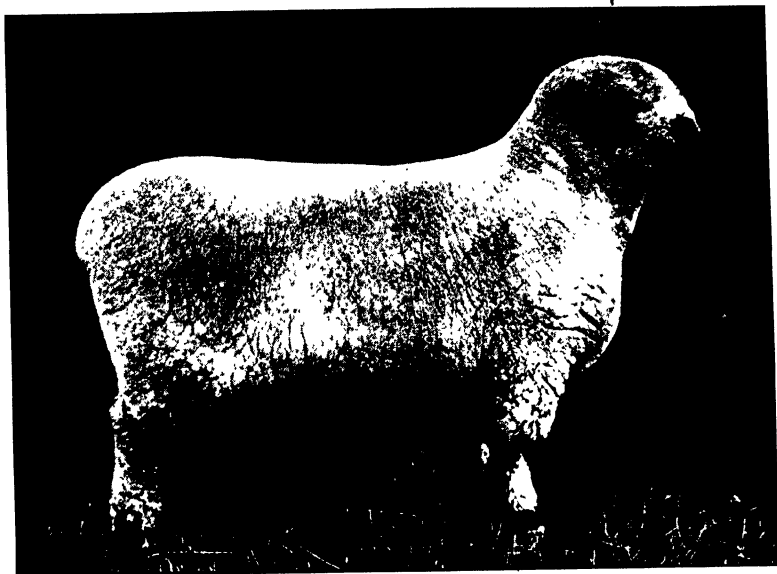


Fig. 76.—SHROPSHIRE SHEARLING TUP.

Winner of the President's Medal for best Shropshire, Inverness Show, 1911. Bred by and the property of Mr Thomas A. Buttar, Corston, Coupar-Angus.



Fig. 77.—OXFORD DOWN SHEARLING TUP.

Winner of the President's Medal for best Oxford Down, Inverness Show, 1911. Bred by and the property of the Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

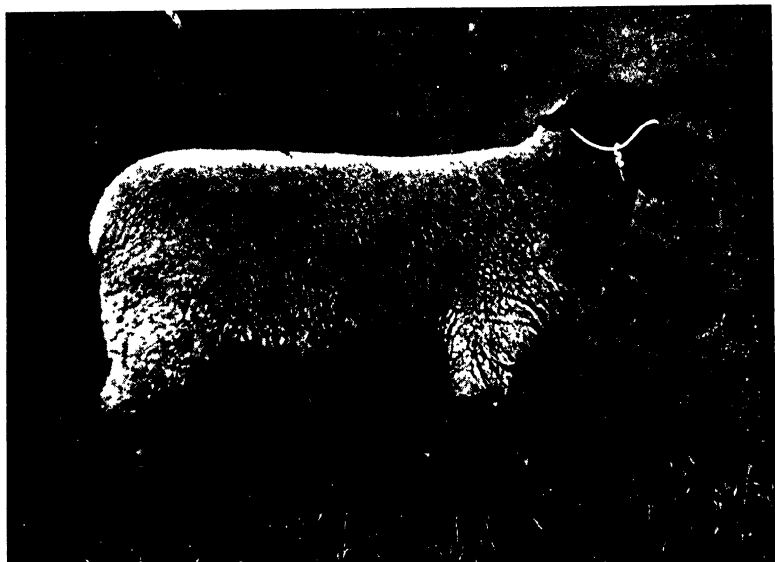


Fig. 78.—SUFFOLK TUP LAMB.

Winner of the President's Medal for best Suffolk Sheep, Inverness Show, 1911. Bred by and the property of Mr Allan Grant, Wester Alves, Alves, Forres.



Fig. 79.—LARGE WHITE BOAR, "WORSLEY TURK VI." 12,975.

Winner of the President's Medal for best pen of Swine, Inverness Show, 1911. Bred by and the property of The Earl of Ellesmere, Worsley Hall, Manchester.

Finally, a portion of ground—three yards—over three drills, was marked off, and carefully graiped for covered or buried potatoes, which were collected and counted.

During the trial the judges made careful and frequent observations as to the manner in which the machines lifted the potatoes and deposited them on the ground.

OBSERVATIONS AS TO DAMAGED POTATOES, &C.

Machine.	Proportion of cut and damaged potatoes (per cent).	Potatoes collected from two drills, after harrowing (lbs.)	Potatoes collected from three drills, after graiping a length of 3 yards.
No. 1.	5·6	80	23
No. 2.	2·4	87	14
No. 7.	4·8	110	36
No. 13.	6·4	82	23
No. 14. The shaws choked this machine after it had gone a few yards along the first drill and prevented its working, so it was not possible to take any observations that could be compared with those obtained from the other machines.			

DESCRIPTION AND PERFORMANCE OF THE COMPETING MACHINES.

The machines entered by Messrs J. D. Allan & Son were on the "Harder" principle, with the poles of the digger-forks working in a ring-neck; the distinctive feature of machines designed on this principle is the graip-like action of the forks, which enter the soil in an almost vertical direction. Each machine was fitted with a revolving reel for preventing the potatoes from being thrown too far. No. 2 machine was geared so as to move the forks at about 10 per cent less speed than No. 1 machine, and the judges were of opinion that the slower machine did the best work of the two with the dry soil.

Mr Pollock's machine is also on the "Harder" principle. As in the above two machines, the forks, wheels, and poles are all adjustable to suit the requirements of all conditions of working. The frame is of pressed steel, and roller bearings are fitted.

In the machine submitted by Messrs John Wallace & Sons, the centre of the rotating arm carrying the graips or tines is set to one side of the drill, and the tines are so set that they enter the drill laterally and lift it up. The tines are rotated through the drill, and are maintained in parallelism throughout their movement by an epicyclic gearing device.

This machine seemed to set up a stronger shower of earth than the others, but the potatoes were well laid out.

There is no doubt that the machine brought forward by Mr David Wilson embraces novel and interesting features. The machine is mounted on four wheels with the share well in front. As the share penetrates the ground, the whole drill is lifted and passed, by the forward motion of the machine, on to a cross shake sparred heck, which separates the soil from the potatoes, and deposits them gently on the surface of the ground immediately behind the machine. Unfortunately this machine in its present form cannot lift potatoes from drills unless the shaws have been first removed. When tried on drills without shaws it did fairly good work, leaving the potatoes in a comparatively narrow band, clean and evenly on the surface, with few damaged. The labour of gathering the potatoes after this machine should be less than with the ordinary type of machine.

The judges were favourably impressed with Mr Wilson's machine, which shows merit and promise, though it failed to accomplish the task set the competing machines.

The judges, after giving full and careful consideration to the performances of the several machines, were of opinion that the work done by all was fairly good, and showed improvement as compared with the results obtained at the last trial. At the same time they did not consider that any one machine showed sufficient outstanding merit to justify it being placed in front of its competitors. Although Mr Wilson's machine failed to negotiate the drills upon which the shaws had been left, it did such good work on the cleared drills that the judges placed it on an equality with the other machines as regards awards.

The judges therefore recommended that equal premiums of ten guineas be awarded to the following machines:—

- No. 2. J. D. Allan & Son, Murthly.
- No. 7. Andrew Pollock, Mauchline.
- No. 13. John Wallace & Sons, Glasgow.
- No. 14. David Wilson, East Linton.

(Signed)	JOHN M'HUTCHEN DOBBIE.
(")	WM. T. MALCOLM.
(")	GEORGE DUN.
(")	JOHN EDMOND.
(")	R. STANFIELD, M.Inst.C.E., <i>Engineer.</i>

PREMIUMS AWARDED BY THE SOCIETY IN 1911.

I.—INVERNESS SHOW

25th, 26th, 27th, and 28th July 1911.

ABBREVIATIONS.—V., *Very Highly Commended.* H., *Highly Commended.*
C., *Commended.*

CATTLE

SHORTHORN.

PRESIDENT'S CHAMPION MEDAL for best Shorthorn.

No. 10 The Duke of Portland, Welbeck Abbey, Worksop, Nottingham, "Village Diamond" (100,981).

Tweeddale Gold Medal for Best Shorthorn Bull.

No. 10 The Duke of Portland, Welbeck Abbey, Worksop, Nottingham, "Village Diamond" (100,981).

Best Shorthorn Bull in the Show, entered or eligible for entry in Coates's Herd-Book—£20, given by the Shorthorn Society.

No. 10 The Duke of Portland, Welbeck Abbey, Worksop, Nottingham, "Village Diamond" (100,981).

Breeder of best Bull of any age in Classes 1, 2, and 3—The Silver Medal.

No. 10 W. T. Garne & Son, Aldsworth, Northleach, Glos.

CLASS 1. BULL, calved before 1909.—Premiums, £15, £10, £5, and £3.

1st No. 10 The Duke of Portland, Welbeck Abbey, Worksop, Nottingham, "Village Diamond" (100,981).

2nd No. 6 George Harrison, Gainford Hall, Darlington, "Prince Olaf 2nd" (103,410).

3rd No. 3 William Anderson, Saphock, Old Meldrum, "Diamond Star" (91,479).

4th No. 9 Colonel Charles Munro, Mains of Murthly, Aberfeldy, "Massena" (99,662).

V No. 12 J. & G. Young, Tarrel, Fearn, "King's Courier" (102,691).

H No. 4 Alexander T. Gordon, Loanhead, Inch, N.B., "Beaufort Referee" (101,473).

C No. 2 T. A. Anderson, Nonikiln, Alness, "Matchless Challenger" (99,581).

CLASS 2. BULL, calved in 1909.—Premiums, £15, £10, £5, and £3.

- 1st No. 20 C. E. Gunther, Tongswood, Hawkhurst, Kent, "Tongswood Bamton" (107,295).
 2nd No. 23 Alexander Murray, Old Manse, Boyndie, Banff, "Proud Baron" (106,623).
 3rd No. 21 George Harrison, Gainford Hall, Darlington, "Gainford Pride 2nd" (108,691).
 4th No. 17 Alexander T. Gordon, Loanhead, Inch, N.B., "Marmion."
 V No. 16 Lady Gordon Cathcart, Cluny Castle, Aberdeenshire, "Dunglass Commodore" (105,356).
 H No. 14 A. V. Cameron, Newton of Stracathro, Brechin, "Clipper's Dairyman" (105,048).
 C No. 22 R. Wylie Hill, Balthayock, Perth, "Proud Beau 3rd" (106,627).
 C No. 29 John A. & G. Ross, Millcraig, Alness, "Beaufort Rambler" (104,738).
 C No. 30 Major Stirling of Fairburn, Muir of Ord, N.B., "Fairburn Baron."

CLASS 3. BULL, calved in 1910.—Premiums, £12, £8, £4, and £2.

- 1st No. 32 William Anderson, Saphock, Old Meldrum, "Royal Stamp."
 2nd No. 43 William & J. W. Peterkin, Dunglass, Conon Bridge, "Diamond Crown."
 3rd No. 36 George Harrison, Gainford Hall, Darlington, "Trump Card" (110,449).
 4th No. 34 Trustees of the late Colonel George Smith Grant of Minmore, Glenlivet, "Rubicon."
 V No. 44 Duncan Stewart, Millhills, Crieff, "Scotland's Choice" (110,098).
 H No. 37 Colonel C. J. Johnson, Linksfield, Elgin, "Linksfield Conqueror."
 C No. 40 The Earl of Moray, Doune Lodge, Doune, "Doune Goldstamp."

Best Shorthorn Female in the Show, entered or eligible for entry in Coates's Herd-Book—£20, given by the Shorthorn Society.

- No. 48 Alexander T. Gordon, Loanhead, Inch, N.B., "Florrie."

CLASS 4. COW, of any age, in Milk.—Premiums, £12, £8, £4, and £2.

- 1st No. 48 Alexander T. Gordon, Loanhead, Inch, N.B., "Florrie."
 2nd No. 54 Stephen Mitchell of Boquhan, Kippen Station, "Royal Violet."
 3rd No. 53 James M'William, Garbity, Orton Station, Elgin, "Tulip Rose."
 4th No. 55 The Earl of Moray, Doune Lodge, Doune, "Doune Rachel."
 V No. 49 John Gordon, Cullisse, Nigg Station, "Princess Royal B 2."
 H No. 50 Trustees of the late Colonel George Smith Grant of Minmore, Glenlivet, "Minmore Fairy 4th."
 C No. 52 James M'William, Garbity, Orton Station, Elgin, "Graceful Maid 3rd."
 C No. 56 John & A. G. Ross, Millcraig, Alness, "Millcraig Marigold IV."

CLASS 5. HEIFER, calved in 1909.—Premiums, £10, £5, £3, and £2.

- 1st No. 64 Colonel the Lord Lovat, K.C.V.O., C.B., D.S.O., Beaufort Castle, Beaulieu, "Rose Royal 4th."
 2nd No. 57 George Campbell, Harthill, Bielside, Aberdeen, "Rose of Suddie."
 3rd No. 61 Trustees of the late Colonel George Smith Grant of Minmore, Glenlivet, "Martha 5th."
 4th No. 59 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch, R.S.O., "Diamond Hope."
 V No. 66 The Earl of Moray, Doune Lodge, Doune, "Doune Maud."
 H No. 67 Alexander Murray, Old Manse, Boyndie, Banff, "Ruby Campana."
 C No. 60 A. G. Maxtone Graham, Redgorton, Perth, "Marwood Queen 3rd."
 C No. 62 R. Wylie Hill, of Balthayock, Perth, "Clara H."

CLASS 6. HEIFER, calved in 1910.—Premiums, £10, £5, £3, and £2.

- 1st No. 71 C. M. Cameron, Balnakyle, Munloch, "Princess 20th."
 2nd No. 78 A. G. Maxtone Graham, Redgorton, Perth, "Sweet Crocus."
 3rd No. 86 James M'William, Garbity, Orton Station, Elgin, "Golden Duchess."
 4th No. 90 Duncan Stewart, Millhills, Crieff, "Scottish Grace."
 V No. 84 Colonel the Lord Lovat, K.C.V.O., C.B., D.S.O., Beaufort Castle, Beaulieu, "Broadhooks Pride 4th."
 H No. 74 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch, R.S.O., "Duchess of Barrington 80th."

- C No. 76 Alexander M. Gordon of Newton, Inch, "Newton Jealousy 8th."
 C No. 79 Trustees of the late Colonel George Smith Grant of Minmore, Glenlivet,
 "Sunbeam of Minmore 2nd."
 C No. 80 R. Wylie Hill of Balthayock, Perth, "Heau Mysie 3rd."

ABERDEEN-ANGUS.

PRESIDENT'S CHAMPION MEDAL for best Aberdeen-Angus Animal.

No. 126 J. E. Kerr of Harviestoun Castle, Dollar, "Juanista Erica" (44,037).

Best Bull of any age in Classes 7, 8, and 9—Ballindalloch Challenge Cup, value £50, given by the late Sir George Macpherson-Grant, Bart.

No. 103 Viscount Allendale, Bywell Hall, Stocksfield, Northumberland, "Elmhore" (29,122).

Breeder of the Winner of the Ballindalloch Challenge Cup—The Silver Medal.

No. 103 His late Majesty King Edward VII., Abergeldie Mains, Ballater.

Champion Gold Medal, value £10, for best Animal in the Breeding Classes, Breeding Animals shown as "Extra Stock" being eligible to compete, given by the Aberdeen-Angus Cattle Society.

No. 126 J. E. Kerr of Harviestoun Castle, Dollar, "Juanista Erica" (44,037).

Breeder of best Bull of any age in Classes 7, 8, and 9—The Silver Medal.

No. 103 His late Majesty King Edward VII., Abergeldie Mains, Ballater.

CLASS 7. BULL, calved before 1st December 1908.— **Premiums, £15, £10, £5, and £3.**

- 1st No. 96 James W. H. Grant, Wester Elchies, Aberlour, "Earl Elgin of Ballindalloch" (27,867).
 2nd No. 95 George Cran, Morlich, Glenkindie, "Just Jeshurun of Morlich" (25,823).
 3rd No. 94 Andrew Brooks, North Elphinstone, Tranent, "Periodical of Glamis" (28,457).
 4th No. 93 David R. Arnot, The Mains, Edzell, "Kaptán" (27,027).
 V No. 99 Colonel Charles M'Inroy, C.B., of The Burn, Edzell, "Young Egmont" (28,859).
 H No. 98 John M'Ainsh, Congash, Grantown-on-Spey, "Lord Leicester" (28,290).
 C No. 101 A. D. Macrae, Ruthven, Kingussie, "Earl-Echo of Ballindalloch" (26,706).

CLASS 8. BULL, calved on or after 1st December 1908.— **Premiums, £15, £10, £5, and £3.**

- 1st No. 103 Viscount Allendale, Bywell Hall, Stocksfield, Northumberland, "Elmhore" (29,122).
 2nd No. 108 D. Y. Stewart, Carse of Trowan, Crieff, "Prince Blueblood of Ballindalloch" (29,807).
 3rd No. 109 The Earl of Strathmore, Glamis Castle, Glamis, "Lord Emerald" (29,546).
 4th No. 106 R. Wylie Hill of Balthayock, Perth, "Erinello" (29,207).
 V No. 107 Sir John Macpherson-Grant, Bart., Ballindalloch Castle, Ballindalloch, "Equable of Ballindalloch" (29,179).

CLASS 9. BULL, calved on or after 1st December 1909.— **Premiums, £12, £8, £4, and £2.**

- 1st No. 120 Walter Wilson, Inchgower, Buckie, "Prince of Aden" (31,097).
 2nd No. 118 Andrew Brooks, North Elphinstone, Tranent, "Boxer of Moncur" (30,215).

- 3rd No. 117 John Hepburn, Dalchirach, Ballindalloch, "Evendor of Dalchirach" (30,619).
 4th No. 112 T. H. Bainbridge, Eshott Hall, Felton, Northumberland, "Baron Breslua" (30,146).
 V No. 111 D. M. Allan, Ballintomb, Grantown, "George R. of Ballindalloch" (30,611).

Best Cow of any age in Class 10—Ballindalloch Challenge Cup, value £50, given by the late Mr C. Macpherson Grant of Drumduan.

- No. 126 J. E. Kerr of Harviestoun Castle, Dollar, "Juanista Erica" (44,037).

Breeder of the Winner of the Ballindalloch Challenge Cup—The Silver Medal.

- No. 126 J. E. Kerr of Harviestoun Castle, Dollar.

CLASS 10. COW, of any age, in Milk.—Premiums, £12, £8, £4, and £2.

- 1st No. 126 J. E. Kerr of Harviestoun Castle, Dollar, "Juanista Erica" (44,037).
 2nd No. 123 James Beddie, Banks, Strichen, "Demora Vine 17th" (43,307).
 3rd No. 122 T. H. Bainbridge, Eshott Hall, Felton, Northumberland, "Marjorie of Eshott" (44,854).
 4th No. 128 The Countess Dowager of Seafield, Cullen House, Cullen, "Neat Miss Burgess" (42,851).
 V No. 121 His Majesty the King, Abergeldie Mains, Ballater, "Prideswing" (41,603).
 H No. 124 John Ritchie Findlay of Aberlour, Aberlour, "Elatine of Auchorachan" (43,792).

CLASS 11. HEIFER, calved on or after 1st December 1908.—Premiums, £10, £5, £3, and £2.

- 1st No. 132 George Cran, Morlich, Glenkindie, "Daffodil Duchess 29th" (45,268).
 2nd No. 131 James Beddie, Banks, Strichen, "Demora Vine 22nd" (44,901).
 3rd No. 137 John M'G. Petrie, Glenlogie, Forbes, Alford, Aberdeenshire, "Pride of Dublin" (45,987).
 4th No. 129 His Majesty the King, Abergeldie Mains, Ballater, "Gwyf" (44,760).
 V No. 134 Trustees of the late Colonel George Smith Grant, Advie Mains, Advie, "Prideaux" (45,445).
 H No. 130 T. H. Bainbridge, Eshott Hall, Felton, Northumberland, "Belinda of Clury" (45,451).
 C No. 135 James Kennedy of Doonholm, Ayr, "Elinora" (45,663).

CLASS 12. HEIFER, calved on or after 1st December 1909.—Premiums, £10, £5, £3, and £2.

- 1st No. 158 The Countess Dowager of Seafield, Home Farm, Cullen House, Cullen, "Queen Rosie of Cullen" (47,884).
 2nd No. 140 T. H. Bainbridge, Eshott Hall, Felton, Northumberland, "Proud Grace of Eshott" (46,552).
 3rd No. 151 J. E. Kerr of Harviestoun Castle, Dollar, "Juanessa Erica" (47,425).
 4th No. 155 Sir John Macpherson-Grant, Bart., Ballindalloch Castle, Ballindalloch, "Evie 2nd of Ballindalloch" (47,205).
 V No. 150 James Kennedy of Doonholm, Ayr, "Ermona" (47,418).
 H No. 141 James Beddie, Banks, Strichen, "Demora Vine 25th" (46,596).
 C No. 152 Colonel Charles M'Inroy, C.B., of The Burn, Edzell, "Moosie" (47,029).

GALLOWAY.

PRESIDENT'S CHAMPION MEDAL for best Galloway.

- No. 174 Robert Graham, Auchengassel, Twynholm, "Our Sally" (18,674).

Breeder of best Bull of any age in Classes 13, 14, and 15—The Silver Medal.

- No. 167 W. A. M'Turk, Barlae, Dalry, Galloway.

CLASS 13. BULL, calved before 1st December 1908.—
Premiums, £15, £10, £5, and £3.

- 1st No. 162 Thomas Biggar & Sons, Chapelton, Dalbeattie, "Sweepstakes" (10,001).
2nd No. 163 Robert Graham, Auchengassel, Twynholm, "War Boy of Craighouse" (10,176).

CLASS 14. BULL, calved on or after 1st December 1908.—
Premiums, £15, £10, £5, and £3.

- 1st No. 165 Robert Graham, Auchengassel, Twynholm, "Legacy of Auchengassel" (10,902).
2nd No. 166 Thomas Graham, Craigs Farm, Dumfries, "Legislator of Hensol" (10,741).
3rd No. 164 Sir Robert William Buchanan-Jardine, Bart., of Castlemilk, Lockerbie, "Mascot" (10,830).

CLASS 15. BULL, calved on or after 1st December 1909.—
Premiums, £12, £8, £4, and £2.

- 1st No. 167 Thomas Biggar & Sons, Chapelton, Dalbeattie, "Kingsley" (11,130).
2nd No. 170 Robert Graham, Auchengassel, Twynholm, "Minor of Auchengassel" (11,167).
3rd No. 169 Robert Graham, Auchengassel, Twynholm, "Masterkey" (11,165).
4th No. 168 Sir Robert William Buchanan-Jardine, Bart., of Castlemilk, Lockerbie, "Archer V. of Castlemilk" (11,010).

CLASS 16. COW, of any age, in Milk.—Premiums, £12, £8, £4, and £2.

- 1st No. 174 Robert Graham, Auchengassel, Twynholm, "Our Sally" (18,674).
2nd No. 173 Sir Robert William Buchanan-Jardine, Bart., of Castlemilk, Lockerbie, "Novelette II. of Castlemilk" (19,786).
3rd No. 171 Thomas Biggar & Sons, Chapelton, Dalbeattie, "Baroness II. of Chapelton" (18,789).
4th No. 172 The Duke of Buccleuch and Queensberry, K.G., K.T., Drumlanrig Castle, Thornhill, Dumfriesshire, "Fairy Queen VIII. of Drumlanrig" (19,073).

CLASS 17. HEIFER, calved on or after 1st December 1908.—
Premiums, £10, £5, £3, and £2.

- 1st No. 181 Robert Graham, Auchengassel, Twynholm, "Louisa of Auchengassel" (21,609).
2nd No. 178 W. B. Donaldson, Dunkyan, Killearn, "Rowena" (21,736).
3rd No. 182 Robert Graham, Auchengassel, Twynholm, "Lilac of Auchengassel" (21,606).
4th No. 180 Francis N. M. Gourlay, Milnton, Tynron, Thornhill, N.B., "Rosetta of Craigneston" (21,453).
H No. 179 Arthur H. Fox-Brockbank, The Croft, Kirksanton, Silecroft, Cumberland, "Santeve" (21,450).

CLASS 18. HEIFER, calved on or after 1st December 1909.—
Premiums, £10, £5, £3, and £2.

- 1st No. 183 Thomas Biggar & Sons, Chapelton, Dalbeattie, "Lizzie 4th of Chapelton" (21,854).
2nd No. 189 Arthur H. Fox-Brockbank, The Croft, Kirksanton, Silecroft, Cumberland, "Nightingale" (21,916).
3rd No. 190 Francis N. M. Gourlay, Milnton, Tynron, Thornhill, N.B., "Fedora of Craigneston" (21,953).
4th No. 185 The Duke of Buccleuch and Queensberry, K.G., K.T., Drumlanrig Castle, Thornhill, Dumfriesshire, "Pride 45th of Drumlanrig" (21,822).
V No. 186 The Duke of Buccleuch and Queensberry, K.G., K.T., Drumlanrig Castle, Thornhill, Dumfriesshire, "Agnes of Drumlanrig" (21,827).
H No. 191 Francis N. M. Gourlay, Milnton, Tynron, Thornhill, N.B., "Freda of Craigneston" (21,955).

HIGHLAND.

PRESIDENT'S CHAMPION MEDAL for best Highland Animal.

No. 224 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Fuinary Queen" (7705).

Breeder of best Bull of any age in Classes 19, 20, and 21—The Silver Medal.

No. 217 The Earl of Southesk, Kinnaird Castle, Brechin.

CLASS 19. BULL, calved before 1909.—Premiums, £15, £10, £5, and £3.

- 1st No. 195 Lady Currie of Garth, Balnacraig Farm, Fortingall, "Coirneal-a-Ghlinne So."
 2nd No. 193 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Colum Ban a Ribhist of Farr" (2393).
 3rd No. 194 Ian Bullough, Meggernie Castle, Aberfeldy, "Au Scanalair" (2368).
 4th No. 199 D. A. Stewart of Lochdhu, Nairn, "An Ceannaid Ruadh" (2364).
 V No. 197 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Morvern Monarch" (2471).
 H No. 196 J. M. Hall, Killeen, Tayinloan, "Mac Albannach."
 C No. 198 William Sopper of Dunmaglass, Daviot, "Au-to-ighre" (2240).

CLASS 20. BULL, calved in 1909.—Premiums, £15, £10, £5, and £3.

- 1st No. 203 D. A. Stewart of Lochdhu, Nairn, "Morair Inernarin."
 2nd No. 200 Lady Currie of Garth, Balnacraig Farm, Fortingall, "Iarla of Garth" (2445).
 3rd No. 202 The Earl of Southesk, Kinnaird Castle, Brechin, "Sidon."
 4th No. 201 Thomas A. Nelson of Achnacloich, Connel, Argyll, "Rona II. of Achnacloich."

CLASS 21. BULL, calved in 1910.—Premiums, £12, £8, £4, and £2.

- 1st No. 217 The Earl of Southesk, Kinnaird Castle, Brechin, "Merlin."
 2nd No. 205 Ian Bullough, Meggernie Castle, Aberfeldy, "Gille Coir of Meggernie."
 3rd No. 216 The Earl of Southesk, Kinnaird Castle, Brechin, "Douglas."
 4th No. 208 Kenneth M'Donnell of Logan, Ardwell, Stranraer, "Carrick Domhnall Mollach of Logan."
 V No. 212 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Righ of Morvern."
 H No. 213 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Morair of Morvern."
 C No. 215 William Sopper of Dunmaglass, Daviot, "Briton."

CLASS 22. COW, of any age, in Milk.—Premiums, £12, £8, £4, and £2.

- 1st No. 224 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Fuinary Queen" (7705).
 2nd No. 226 The Earl of Southesk, Kinnaird Castle, Brechin, "Princess Caroline" (7392).
 3rd No. 222 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Empress Victoria" (6513).
 4th No. 227 D. A. Stewart of Lochdhu, Nairn, "Shella 17th" (7400).
 V No. 218 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Mairi Ruadh II. of Atholl."
 H No. 219 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Bean Bhuidhe 5th of Atholl."
 C No. 223 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Empress" (6510).

CLASS 23. HEIFER, calved in 1908.—Premiums, £10, £5, £3, and £2.

- 1st No. 238 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Fuinary Duchess."
 2nd No. 230 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Te Riabhach XII. of Atholl."
 3rd No. 240 D. A. Stewart of Lochdhu, Nairn, "Laochag."

- 4th No. 239 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Princess Veronica" (7502).
 V No. 237 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Emma of Castle Grant" (7681).
 H No. 236 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Queen of Castle Grant" (7691).
 C No. 233 W. D. Mackenzie of Farr, House of Farr, Farr, Daviot, "Bhean-an-Tigh of Farr" (7628).

CLASS 24. HEIFER, calved in 1909.—Premiums, £10, £5, £3, and £2.

- 1st No. 251 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Proisag of Castle Grant."
 2nd No. 241 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Te Riabhach XIII. of Atholl."
 3rd No. 257 D. A. Stewart of Lochdhu, Nairn, "Laochag."
 4th No. 250 The Countess Dowager of Seafield, Castle Grant, Grantown, Strathspey, "Lady Elinor of Castle Grant."
 V No. 252 Gerard Craig Sellar, Ardtornish, Morvern, Argyll, "Edith of Fuinary."
 H No. 253 William Soppor of Dunmaglass, Daviot, "Primrose II." (7713).
 C No. 256 D. A. Stewart of Lochdhu, Nairn, "Shellay."

AYRSHIRE.

PRESIDENT'S CHAMPION MEDAL for best Ayrshire.

- No. 232 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Memonas" (27,382).

Special Prize of £10 for the best Male Animal of the Ayrshire breed, entered with a number in the Ayrshire Cattle Herd-Book not later than 1st January 1911—given by the Ayrshire Cattle Herd-Book Society.

- No. 264 Thomas Barr, Hobsland, Monkton, "Hobsland Masterpiece" (8795).

Breeder of best Bull of any age in Classes 25, 26, and 27—The Silver Medal.

- No. 264 Robert M'Kinlay, Hill House, Sandilands, Lanark.

CLASS 25. BULL, calved before 1909.—Premiums, £12, £8, and £4.

- 1st No. 258 James Howie, Hillhouse, Kilmarnock, "Sir William" (8096).
 2nd No. 260 Robert Osborne, Morton Mains, Thornhill, "Auchenbrain Pluto" (7541).
 3rd No. 259 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Valmont" (7468).

CLASS 26. BULL, calved in 1909.—Premiums, £10, £7, and £3.

- 1st No. 261 James Howie, Hillhouse, Kilmarnock, "Howie's Ayr Review" (8148).
 2nd No. 262 James Howie, Hillhouse, Kilmarnock, "Brae Rising Star" (8187).

CLASS 27. BULL, calved in 1910.—Premiums, £8, £5, and £3.

- 1st No. 264 Thomas Barr, Hobsland, Monkton, "Hobsland Masterpiece" (8795).
 2nd No. 266 James Howie, Hillhouse, Kilmarnock, "Howie's Aristocrat" (8762).
 3rd No. 263 Thomas Barr, Hobsland, Monkton, "Hobsland Aviator" (8794).

Special Prize of £10 for the best Female Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book, not later than 1st January 1911—given by the Ayrshire Cattle Herd-Book Society.

- No. 282 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Memonas" (27,382).

CLASS 28. COW, calved before 1908, in Milk.—Premiums, £12, £8, and £4.

- 1st No. 270 Mrs Howie, Finnock Bog, Inverkip, "Finnock Bog Heather Bell" (24,111).
 2nd No. 268 Alexander Cross of Knockdon, Maybole, "Bridesmaid IV." (19,089).
 3rd No. 271 W. & J. Kerr, Old Graitney, Greta, "Old Graitney Yellow Bess."

CLASS 29. COW, of any age, in Calf, or HEIFER, calved in 1908, in Calf and due to calve within nine months after the Show.—Premiums, £10, £7, and £3.

- 1st No. 274 Charles Douglas of Auchlochan, Lesmahagow, "Auchlochan Janet."
 2nd No. 272 Alexander Cross of Knockdon, Maybole, "Red Rose II." (19,116).
 3rd No. 275 Lieutenant-Colonel Fergusson-Buchanan, of Auchentorlie, Bowling, "Auchentorlie Bella" (18,671).

CLASS 30. HEIFER, calved in 1909, in Calf and due to calve not sooner than 1st September nor later than 31st December 1911.—Premiums, £10, £7, and £3.

- 1st No. 277 Thomas Barr, Hobsland, Monkton, "Violet 5th" (28,322).
 2nd No. 279 W. & J. Kerr, Old Graitney, Greta, "Old Graitney Juanita II."

CLASS 31. HEIFER, calved in 1909.—Premiums, £10, £5, and £3.

- 1st No. 282 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Memonas" (27,382).
 2nd No. 280 Thomas Barr, Hobsland, Monkton, "Hobsland Bell" (28,318).
 3rd No. 281 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Vereen" (27,386).

CLASS 32. HEIFER, calved in 1910.—Premiums, £8, £5, and £3.

- 1st No. 286 Robert Osborne, Morton Mains, Thornhill, "Morton Mains Lanugem."
 2nd No. 283 Thomas Barr, Hobsland, Monkton, "Hobsland Nancy 3rd" (28,319).
 3rd No. 284 Thomas Barr, Hobsland, Monkton, "Pretty Poll" (28,320).

FAT CATTLE.

PRESIDENT'S CHAMPION MEDAL for best Fat Animal.

- No. 289 Fraser, Kennedy, & Fraser, Gollanfield Mains, Gollanfield, Inverness-shire (Cross), "Gollanfield Boy."

CLASS 33. OX, any pure Breed or Cross, calved after 1st December 1908.—Premiums, £5 and £2.

- 1st No. 289 Fraser, Kennedy, & Fraser, Gollanfield Mains, Gollanfield, Inverness-shire (Cross), "Gollanfield Boy."
 2nd No. 287 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire (Aberdeen-Angus).
 V No. 291 C. W. Dyson Perrins, Ardross Castle, Alness (Aberdeen-Angus).
 H No. 290 James M'William, Garbity, Orton Station, Elgin (Cross).
 C No. 292 C. W. Dyson Perrins, Ardross Castle, Alness (Aberdeen-Angus).

CLASS 34. OX, any pure Breed or Cross, calved after 1st December 1909.—Premiums, £5 and £2.

- 1st No. 295 John Ritchie Findlay of Aberlour, Aberlour (Aberdeen-Angus), "Pat of Aberlour."
 2nd No. 294 C. M. Cameron, Balnakyle, Munlochy (Shorthorn).
 V No. 300 J. G. Young, Cadboll, Fearn, N.B. (Cross).
 H No. 299 John & A. G. Ross, Millcraig, Alness (Cross).
 C No. 296 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch, R.S.O. (Shorthorn).
 C No. 298 James M'William, Garbity, Orton Station, Elgin (Cross).

CLASS 35. HEIFER, any pure Breed or Cross, calved after 1st December 1908.—
Premiums, £5 and £2.

1st No. 302 James M'William, Garbity, Orton Station, Elgin (Cross).

2nd No. 301 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch,
R.S.O. (Aberdeen-Angus Shorthorn Cross).

CLASS 36. HEIFER, any pure Breed or Cross, calved after 1st December 1909.—
Premiums, £5 and £2.

1st No. 306 James M'William, Garbity, Orton Station, Elgin (Shorthorn), "White
Rosebud."

2nd No. 307 John & A. G. Ross, Millcraig, Alness (Cross).

V No. 308 G. Young, Tarrel, Fearn (Shorthorn), "Selina."

C No. 303 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch,
R.S.O. (Shorthorn), "Sunbeam."

C No. 304 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch,
R.S.O. (Shorthorn), "Rosehaugh Dorothy."

HORSES

FOR AGRICULTURAL PURPOSES.

DRAUGHT STALLIONS.

PRESIDENT'S CHAMPION MEDAL for best Clydesdale Stallion or Colt.

No. 366 William Dunlop, Dunure Mains, Ayr, "The Dunure."

Breeder of best Male Animal of any age in Classes 37 to 40—The Silver Medal.

No. 366 J. & T. Robertson, Clendrie, Kirkcolm.

CLASS 37. STALLION, foaled before 1908.—Premiums, £20, £15, £10, and £4.

1st No. 310 Robert Brydon, The Dene, Seaham Harbour, Co. Durham, "Bonnie
Bucklyvie" (14,032).

2nd No. 318 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright, "Gartly
Bonus" (13,491).

3rd No. 319 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright, "British
Time" (14,610).

4th No. 312 William Dunlop, Dunure Mains, Ayr, "Auchenflower" (12,007).

V No. 309 George Alston, Loudon Hill, Darvel, "Black Douglas" (14,599).

H No. 321 John P. Sleigh, St John's Wells, Fyvie, "Baron Ian" (14,584).

C No. 313 William Dunlop, Dunure Mains, Ayr, "Dunure Postman" (15,206).

CLASS 38. ENTIRE COLT, foaled in 1908.—Premiums, £20, £15, £10, and £4.

1st No. 323 William Dunlop, Dunure Mains, Ayr, "Dunure Footprint" (15,203).

2nd No. 324 James Kilpatrick, Craigie Mains, Kilmarnock, "Craigie Dorando"
(15,186).

3rd No. 329 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright, "Baron
Dollar" (15,133).

4th No. 333 T. Purdie-Somerville, Sandilands, Lanark, "Scotland's Champion"
(16,054).

V No. 330 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright, "Keep-
sake" (15,889).

H No. 325 James Kilpatrick, Craigie Mains, Kilmarnock, "Udale" (15,454).

CLASS 39. ENTIRE COLT, foaled in 1909.—Premiums, £20, £12, £8, and £4.

1st No. 340 William Dunlop, Dunure Mains, Ayr, "Dunure Index" (15,809).

2nd No. 356 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright,
"Premier Baron" (15,984).

3rd No. 338 Andrew Dewar, Arnprior, Port of Menteith Station, "Tullibardine."

4th No. 359 William Renwick, Meadowfield, Corstorphine, "Royal Escort"
(16,025).

- V No. 346 James Kilpatrick, Craigie Mains, Kilmarnock, "Emutation."
 H No. 349 William T. Malcolm, Dunmore, by Larbert, "Prince Ossian."
 C No. 353 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright, "Baron Grant" (15,731).
 C No. 336 George Bean, West Balloch, Montrose, "Count Zeppelin" (15,781).
 C No. 348 James Kilpatrick, Craigie Mains, Kilmarnock, "Baurch Surprise."

CLASS 40. ENTIRE COLT, foaled in 1910.—Premiums, £15, £10, £6, and £4.

- 1st No. 366 Wm. Dunlop, Dunure Mains, Ayr, "The Dunure."
 2nd No. 377 T. Purdie-Somerville, Sandilands, Lanark, "Scotland's Favourite."
 3rd No. 374 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright.
 4th No. 373 A. & W. Montgomery, Netherhall and Banks, Kirkcudbright.
 V No. 367 James Fleming, Friock Mains, Friockheim, "Gallant Stewart."
 H No. 371 Sir John Macpherson-Grant, Bart., Ballindalloch Castle, Ballindalloch, "Baronet of Ballindalloch."
 C No. 365 Wm. Dunlop, Dunure Mains, Ayr, "Dunure Social Friend."
 C No. 361 George Alston, Loudon Hill, Darvel, "Drexel."
 C No. 372 Stephen Mitchell, of Boquhan, Kippen Station, "Boquhan Jupiter."

DRAUGHT GELDINGS.

PRESIDENT'S CHAMPION MEDAL for best Draught Gelding.

- No. 332 J. & W. Meiklem, Begg, Kirkcaldy, "Harry."

CLASS 41. DRAUGHT GELDING, foaled before 1908.—Premiums, £10, £5, and £3.

- 1st No. 382 J. & W. Meiklem, Begg, Kirkcaldy, "Harry."
 2nd No. 381 David Hastie & Sons, Eddlewood Farm, Hamilton.
 3rd No. 379 Alexander Cormack, Shandwick Mains, Nigg Station, "Mac."

CLASS 42. DRAUGHT GELDING, foaled in 1908.—Premiums, £6, £4, and £3.

- 1st No. 389 George Robertson, Bullion Farm, Invergowrie, "Harold."
 2nd No. 388 J. & W. Meiklem, Begg, Kirkcaldy, "Willie."
 3rd No. 385 John Hamilton, Springfield, Linlithgow, "Walter."
 V No. 384 Ian A. Forsyth, Balintraid, Delny.

CLASS 43. DRAUGHT GELDING, foaled in 1909.—Premiums, £6, £4, and £3.

- 1st No. 391 J. & W. Meiklem, Begg, Kirkcaldy, "Bob."
 2nd No. 392 W. M. Richie, Balcairn, Old Meldrum.
 3rd No. 393 William R. Ross, Leanach Culloden Moor, "Rory."

DRAUGHT MARES AND FILLIES.

PRESIDENT'S CHAMPION MEDAL for best Clydesdale Mare or Filly.

- No. 411 Stephen Mitchell, of Boquhan, Kippen Station, "Boquhan Lady Peggy."

Best Clydesdale Mare or Filly registered in the Clydesdale Stud-Book—Cawdor Challenge Cup, value 50 guineas, given by the Clydesdale Horse Society.

- No. 398 J. E. Kerr of Harviestoun Castle, Dollar, "Ciaily."

CLASS 44. MARE, of any age, with Foal at foot.—Premiums, £20, £12, £7, and £4.

- 1st No. 398 J. E. Kerr of Harviestoun Castle, Dollar, "Ciaily."
 2nd No. 402 John P. Sleigh, St John's Wells, Fyvie, "Lucilla."
 3rd No. 401 William Neilson, Haining Valley, Linlithgow, "Daisy Primrose" (24,113).
 4th No. 400 Stephen Mitchell of Boquhan, Kippen Station, "Thelma II."
 V No. 396 John Gray, Ardlaw Mains, Fraserburgh, "Lady Dukina."
 H No. 395 John S. Grant, Easter Gallovie, Dulnain Bridge, "Lady Ina."

CLASS 45. YELD MARE, foaled before 1908.—Premiums, £12, £9, £6, and £4.

- 1st No. 403 George Argo, Petty, Fyvie, Aberdeenshire, "Royalette."
- 2nd No. 410 Stephen Mitchell of Boquhan, Kippen Station, "Boquhan Beatrice."
- 3rd No. 406 Leslie Durno, Mains of Glack, Pitcaple, "Adeline."
- 4th No. 409 H. B. Marshall of Rachan, Broughton, Peeblesshire, "Larcelle."
- V No. 408 H. M. S. Mackay, Burgie Lodge Farm, Elgin, "Etta" (21,528).
- H No. 407 James Douglas Fletcher of Rosehaugh, Avoch, R.S.O., "Primora."

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded :—

- No. 411 Stephen Mitchell of Boquhan, Kippen Station, "Boquhan Lady Peggy."

CLASS 46. YELD MARE or FILLY, foaled in 1908.—Premiums, £12, £9, £6, and £4.

- 1st No. 420 John P. Sleigh, St John's Wells, Fyvie, Filly, "Moir." "
- 2nd No. 419 Stephen Mitchell of Boquhan, Kippen Station, Filly, "Sweet Melody."
- 3rd No. 421 D. Y. Stewart, Carse of Trowan, Crieff, Filly, "Moireen."
- 4th No. 414 Robert Chapman, Johnston, Gartcosh, Mare, "Heather Gem."
- V No. 418 H. B. Marshall of Rachan, Broughton, Peeblesshire, Filly, "Maid o' Threase."
- H No. 412 William C. Bowe, Thorntonloch, Innerwick, E. Lothian, Filly, "Cuilvona."

CLASS 47. FILLY, foaled in 1909.—Premiums, £12, £9, £6, and £4.

- 1st No. 425 William Dunlop, Dunure Mains, Ayr, "Dunure Myrem."
- 2nd No. 427 J. E. Kerr of Harviestoun Castle, Dollar, "Harviestoun Amy."
- 3rd No. 433 D. Y. Stewart, Carse of Trowan, Crieff, "Ione."
- 4th No. 426 A. M. Gregory, Nether Bogside, Elgin, "Countess."
- V No. 423 George Armstrong, East Scales, Gretna.
- H No. 429 H. B. Marshal of Rachan, Broughton, Peeblesshire, "Honey Moon."
- C No. 428 John M'Nee, Afton House, Crieff.

CLASS 48. FILLY, foaled in 1910.—Premiums, £12, £9, £6, and £4.

- 1st No. 446 Stephen Mitchell of Boquhan, Kippen Station, "Nannie."
- 2nd No. 442 J. E. Kerr of Harviestoun Castle, Dollar, "Harviestoun Phyllis."
- 3rd No. 444 H. B. Marshall of Rachan, Broughton.
- 4th No. 443 John M'Nee, Afton House, Crieff.
- V No. 438 William Dunlop, Dunure Mains, Ayr, "Dunure Black Silk."
- H No. 441 A. M. Gregory, Nether Bogside, Elgin, "Elaine."
- C No. 437 Robert Chapman, Johnston, Gartcosh, "Heather Fame."

HUNTERS.

PRESIDENT'S CHAMPION MEDAL for best Hunter.

- No. 464 Miss Mary A. Dalrymple, Elliston, St Boswells, Filly, "Lala O'Dale" (3529).

Best Hunter Filly in Classes 49, 50, and 51, registered with a number in the Stud-Book of the Hunter Improvement Society—Champion Gold Medal, given by the Hunters' Improvement Society.

- No. 464 Miss Mary A. Dalrymple, Elliston, St Boswells, Filly, "Lala O'Dale" (3529).

CLASS 49. COLT, GELDING, or FILLY, foaled in 1910, the produce of thoroughbred Stallions, out of Mares of any breed.—Premiums, £10, £5, and £3.

- 1st No. 450 James Cairns, Abercrombie, St Monans, Colt.
- 2nd No. 458 Andrew Wilson, Esbie, Lochmaben, Gelding, "Hazelnut."
- 3rd No. 451 James Cairns, Abercrombie, St Monans, Filly, "Ella" (4143).

- V No. 453 J. A. Campbell, Craigie House, Ayr, Filly, "State Ball" (4078).
 H No. 454 Miss Mary A. Dalrymple, Elliston, St Boswells, Colt, "Ettrick."
 C No. 457 The Earl of Rothes, Leslie House, Leslie, Fife, Filly, "Arail."

CLASS 50. FILLY, MARE, or GELDING, for field, foaled in 1909, *in hand*.—
 Premiums, £10, £5, and £3.

- 1st No. 463 Andrew Wilson, Esbie, Lochmaben, Gelding, "Captain."
 2nd No. 462 Lord Ninian Crichton Stuart, M.P., House of Falkland, Falkland,
 Fife, Gelding, "Babarapp."
 3rd No. 461 Sir John A. Dewar, Bart., M.P., Dupplin Castle, Perth, Filly,
 "Bridget" (4132).

CLASS 51. YELD MARE, FILLY, or GELDING, for field, foaled in 1908,
in hand.—Premiums, £10, £5, and £3.

- 1st No. 464 Miss Mary A. Dalrymple, Elliston, St Boswells, Filly, "Lala O'Dale"
 (3529).

CLASS 52. HUNTER BROOD MARE, with Foal at foot.—
 Premiums, £15, £8, and £4.

- 1st No. 466 James Cairns, Abercrombie, St Monans, "Joyful."
 2nd No. 468 The Earl of Rothes, Leslie House, Leslie, Fife, "Vixen."
 3rd No. 465 James Cairns, Abercrombie, St Monans, "Lady Moubray."
 V No. 467 J. A. Campbell, Craigie House, Ayr, "Princess Betsey."

HACKNEYS.

(ALL SHOWN IN HAND.)

PRESIDENT'S CHAMPION MEDAL for best Hackney in Classes 53 to 55.

- No. 475 Walter Briggs, Linden Hall, Borwick, near Carnforth, Lancashire, "Albin
 Wildfire" (10,551).

CLASS 53. BROOD MARE, 14 hands and over, with Foal at foot or to foal
 this season to a registered sire. Registered in the Hackney Stud-Book.—
 Premiums, £10, £6, and £4.

- 1st No. 471 John Macdonald, jun., Homewood, Inverness, "Abandon of Inver-
 ness" (9719).
 2nd No. 470 John Macdonald, jun., Homewood, Inverness, "Deeside Vesta"
 (8816).

CLASS 54. YELD MARE or FILLY, foaled in 1908. Registered in the
 Hackney Stud-Book.—Premiums, £8, £5, and £3.

- 1st No. 473 Robert Scott, Thornhome, Carlisle, N.B., Mare, "Fair Lily" (20,652).
 2nd No. 472 Walter Briggs, Linden Hall, Borwick, near Carnforth, Lancashire,
 Filly, "Albin Ophelia" (20,474).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded :—

- No. 474 John Macdonald, jun., Homewood, Inverness, Mare, "Blossom."

CLASS 55. STALLION, 3 years old and upwards, 14 hands and over. Registered
 in the Hackney Stud-Book.—Premiums, £10, £6, and £4.

- 1st No. 475 Walter Briggs, Linden Hall, Borwick, near Carnforth, Lancashire,
 "Albin Wildfire" (10,551).
 2nd No. 476 J. E. Kerr of Harviestoun Castle, Dollar, "Harviestoun Matador"
 (11,058).
 3rd No. 477 John Macdonald, jun., Homewood, Inverness, "Abbreviator of
 Inverness" (10,047).

PONIES.

PRESIDENT'S CHAMPION MEDAL for best Pony.

No. 483 J. E. Kerr of Harviestoun Castle, Dollar, Mare, "Harviestoun Rene" (19,951).

CLASS 56. STALLION, 3 years old and upwards, 14 hands and under, *in hand*.—Premiums, £5, £3, and £2.

1st No. 480 J. E. Kerr of Harviestoun Castle, Dollar, "Sir Bantock" (11,212).

2nd No. 481 John Wotherspoon, The Cairns, Cambuslang, "Choir Boy" (10,984).

3rd No. 478 Edward G. Fraser-Tytler of Aldourie, Aldourie Castle, Dores, Inverness, "Pom-pom" (300).

CLASS 57. YELD MARE, FILLY, or GELDING, 3 years old and upwards, over 13 and not over 14 hands, *in saddle*.—Premiums, £5, £3, and £2.

1st No. 483 J. E. Kerr of Harviestoun Castle, Dollar, Mare, "Harviestoun Rene" (19,951).

2nd No. 482 Edward G. Fraser-Tytler of Aldourie, Aldourie Castle, Dores, Inverness, Gelding, "Snapshot."

3rd No. 485 John Simpson, 6 King Street, Aberdeen, Gelding, "Annfield Horace."

H No. 484 John Macdonald, jun., Homewood, Inverness, Mare, "Polly."

CLASS 58. YELD MARE, FILLY, or GELDING, 3 years old and upwards, over 12 and not over 13 hands, *in saddle*.—Premiums, £5, £3, and £2.

1st No. 486 C. C. K. Campbell, Brackla, Nairn, Mare, "Bonny."

CLASS 59. YELD MARE, FILLY, or GELDING, 3 years old and upwards, 12 hands and under, *in hand*.—Premiums, £5, £3, and £2.

1st No. 488 George Urquhart, Millburn Farm, Inverness, Filly, "Polly."

2nd No. 487 James Duncan, Fern Villa, Inverness, Mare, "Tes."

HIGHLAND PONIES.

PRESIDENT'S CHAMPION MEDAL for best Highland Pony.

No. 496 His Majesty the King, Birkhall, Ballater, "Skerryvore" (433).

CLASS 60. HIGHLAND PONY STALLION, of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book.—Premiums, £10, £8, £6, £5, £4, and £2.

1st No. 492 John C. Robertson, Fodderty, Dingwall, "Borrodale" (384).

2nd No. 491 John Macdonald, Glenbrittle, Portree, "Coruisk" (543).

3rd No. 489 James Cairns, Coulshill, Auchterarder, "Allan" (483).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded, also £7, 10s. given by the Board of Agriculture :—

No. 490 William Logan, M.R.C.V.S., Doonbank, Inverness, "Glen Bruar" (331).

CLASS 61. HIGHLAND PONY STALLION, of the light type, 3 years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book.—Premiums £10, £8, £6, £5, £4, and £2.

1st No. 493 J. H. Munro Mackenzie of Calgary, Isle of Mull, "Hyskeer" (430).

2nd No. 494 John C. Robertson, Fodderty, Dingwall, "Special Scout" (529).

3rd No. 495 Charles D. M. Ross, Ibert, Crieff, "Grimsay" (467).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded also £7, 10s. given by the Board of Agriculture :—

No. 496 His Majesty the King, Birkhall, Ballater, "Skerryvore" (433).

The following was Commended, and a Bronze Medal awarded :—

No. 497 Sir John A. Dewar, Bart., M.P., Dupplin Castle, Perth, Colt, "Cairny" (538).

CLASS 62. HIGHLAND PONY MARE, of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, Yeld or with Foal at foot, entered or accepted for entry in the Highland Section of the Polo Pony Stud-Book.—Premiums, £10, £3, and £2.

- 1st No. 502 A. M'Hardy, Braemore, Garve, Ross-shire, "Mona of Braemore" (2164).
 2nd No. 508 John Robson, jun., Lynegar, Watten, "Elkar" (2143).
 3rd No. 504 Charles William Dyson Perrins of Ardross, Alness, Ross-shire, "Kate" (2172).
 V No. 499 Mrs Cheape, "The Squire," M.H. Carsaig, Carsaig, Mull, "Cailaig Muileach."
 H No. 507 John C. Robertson, Fodderty, Dingwall, "Smoo" (2141).
 C No. 498 The Duke of Atholl, K.T., Blair Castle, Blair-Atholl, "Lady Louise" (1530).
 C No. 500 Robert Hargreaves, Gaick Forest, Kingussie, "Garg-Gaick" (2160).
 C No. 501 Allan R. Macdonald, Waternish, Stein, Isle of Skye, "Froach" (2180).
 C No. 503 Hugh Morrison of Islay, Islay House, Bridgend, Islay, "Highland Maggie" (1687).
 C No. 505 Charles William Dyson Perrins of Ardross, Alness, Ross-shire, "Maggie" (2173).
 C No. 506 Charles William Dyson Perrins of Ardross, Alness, Ross-shire, "Mona" (2174).
 C No. 509 William Ross, Bridgend, Dingwall, "Gipsy V." (2146).
 C No. 510 Sir Peter Walker, Bart., Killiechonnate, Spean-Bridge, "Unachan" (2157).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded :—

No. 511 Robert Hargreaves, Gaick Forest, Kingussie, "Mountain Polly" (1850).

Class 63. HIGHLAND PONY MARE, of the light type, 3 years old or upwards, not exceeding 14.2 hands, Yeld or with Foal at foot, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book.—Premiums, £10, £3, and £2.

- 1st No. 523 W. D. Mackenzie of Farr, House of Farr, Farr, Daviot, "Slioch" (2163).
 2nd No. 527 John C. Robertson, Fodderty, Dingwall, "Brownie III." (2139).
 3rd No. 534 R. L. Thomson of Eigg and Strathaird, Eigg, "Nora II." (2156).
 V No. 515 James Douglas Fletcher of Rosehaugh, Avech, R.S.O., "Lady Strathnairn" (1847).
 H No. 519 Robert Hargreaves, Gaick Forest, Kingussie, "Maid of the Doun" (2161).
 C No. 530 Sir Edward Stewart-Richardson, Bart., Pitfour Castle, Glencarse, Perthshire, "Mavia Dhu" (1996).

SHETLAND PONIES.

(ALL SHOWN IN HAND.)

PRESIDENT'S CHAMPION MEDAL for best Shetland Pony.

No. 567 William Mungall of Transy, Dunfermline, "Silver Queen" (1197).

Group of Shetland Ponies, consisting of Mare and two of her progeny exhibited in the Ordinary Classes or as "Extra Stock," and entered or eligible for entry in the Shetland Pony Stud-Book—Special Prize, value £10, given by the President of the Shetland Pony Stud-Book.

Nos. 567, 541, 543 William Mungall of Transy, Dunfermline.

Silver Medal for Best Shetland Pony exhibited in ordinary Classes, of opposite sex to the winner of the President's Champion Medal—given by the President of the Shetland Pony Stud-Book.

No. 544 Charles Douglas of Auchlochan, Lesmahagow, "Everlasting of Auchlochan."

CLASS 64. STALLION, not exceeding 10½ hands, foaled before 1908.—
Premiums, £5, £4, £3, and £2.

- 1st No. 541 William Mungall of Transy, Dunfermline, "Silver Star of Transy."
- 2nd No. 542 John Smith, Pittodrie House, Milltimber, Aberdeenshire, "Stentor of Transy."
- 3rd No. 539 William Mathewson, Comrie Castle, East Grange Station, Fifeshire, "Dvorak" (375).
- 4th No. 537 Charles Douglas of Auchlochan, Lesmahagow, "Auchlochan Buccaneer."
- V No. 540 George A. Miller, Lawmuir, Methven, "Mirthful of Earlsall" (460).
- H No. 535 George Christie, Newton House, Elgin, "Triumph of Cacketts" (524).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded:—

No. 543 William Mungall of Transy, Dunfermline, "Silverton of Transy" (518).

The following was Commended, and a Bronze Medal awarded:—

No. 538 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, Avoch, R.S.O., "Merry Hero" (244).

CLASS 65. ENTIRE COLT, not exceeding 10½ hands, foaled in 1908 or 1909.—
Premiums, £5, £4, £3, and £2.

- 1st No. 544 Charles Douglas of Auchlochan, Lesmahagow, "Everlasting of Auchlochan."
- 2nd No. 549 William Mungall of Transy, Dunfermline, "Nota Bene."
- 3rd No. 545 Charles Douglas of Auchlochan, Lesmahagow, "Playmate of Auchlochan."
- 4th No. 551 Miss A. L. Spofforth, Glendruith, Inverness, "Merry of Kingcausie."
- V No. 547 George A. Miller, Lawmuir, Methven, "Baron of Lawmuir."
- H No. 550 William Mungall of Transy, Dunfermline, "Seymour of Transy."
- C No. 546 James Duncan, Fern Villa, Inverness, "Vaila Gunnar."

CLASS 66. MARE, not exceeding 10½ hands, with Foal at foot.—
Premiums, £5, £4, £3, and £2.

- 1st No. 561 William Mungall of Transy, Dunfermline, "Perfection" (1489).
- 2nd No. 562 William Mungall of Transy, Dunfermline, "Lady Steynor" (2510).
- 3rd No. 560 George A. Miller, Lawmuir, Methven, "Bramhope Miriam."
- 4th No. 563 John Smith, Pittodrie House, Milltimber, Aberdeenshire, "Unique" (2181).
- V No. 552 Robert William Duff of Fetteresso, Stonehaven, "Hecuba."

- H No. 554 James Douglas Fletcher of Rosehaugh, Avoch, R.S.O., "Lady Emma" (2003).
 C No. 558 William Mathewson, Comrie Castle, East Grange Station, Fifeshire, "Bramhope Nora" (1831).
 C No. 559 William Mathewson, Comrie Castle, East Grange Station, Fifeshire, "Minutia" (2199).

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded:—

- No. 567 William Mungall of Transy, Dunfermline, "Silver Queen" (1197).

The following was Commended, and a Bronze Medal awarded:—

- No. 566 George A. Miller, Lawmuir, Methven, "Beatrice" (1533).

CLASS 67. YELD MARE, not exceeding 10½ hands.—
 Premiums, £5, £4, £3, and £2.

- 1st No. 573 William Mungall of Transy, Dunfermline, "Naiad."
 2nd No. 570 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, "Lady VI" (2004).
 3rd No. 572 William Mungall of Transy, Dunfermline, "Danish Queen" (1424).
 4th No. 571 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire, "Merry Mischief."
 V No. 568 Charles Douglas of Auchlochan, Lesmahagow, "Petronella of Auchlochan."
 H No. 569 R. W. Duff of Fetteresso, Stonehaven, "Jewel of Fetteresso."

CLASS 68. FILLY, not exceeding 10½ hands, foaled in 1908 or 1909.—
 Premiums, £5, £4, £3, and £2.

- 1st No. 578 William Mungall of Transy, Dunfermline, "Princess Patricia of Transy."
 2nd No. 574 Charles Douglas of Auchlochan, Lesmahagow, "Primavera."
 3rd No. 579 William Mungall of Transy, Dunfermline, "Perilla of Transy."
 4th No. 576 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire.
 V No. 577 George A. Miller, Lawmuir, Methven, "Kathrine of Lawmuir."
 H No. 575 Charles Douglas of Auchlochan, Lesmahagow, "Pattern of Auchlochan."

DRIVING COMPETITIONS.

PRESIDENT'S CHAMPION MEDAL for best animal in the Classes for Horses in Harness.

- No. 580 Alexander T. Gordon, Loanhead, Inch, Gelding, "Rey-del-Aide."

CLASS 69. YELD MARE, FILLY, or GELDING, any age, in Harness, 15 hands and upwards, to be driven in the ring.—Premiums, £10, £5, and £3.

- 1st No. 580 Alexander T. Gordon, Loanhead, Inch, Gelding, "Rey-del-Aide."
 2nd No. 581 James Wilson, 45 Downieville Crescent, Dunfermline, Gelding, "Fascinator."
 3rd No. 474 John Macdonald, jun., Homewood, Inverness, Mare, "Blossom."

CLASS 70. YELD MARE, FILLY, or GELDING, any age, in Harness, under 15 hands, to be driven in the ring.—Premiums, £10, £5, and £3.

- 1st No. 583 D. Macrae, Falls of Truim, Newtonmore, Gelding, "Prince Fortunatus."
 2nd No. 582 Alexander T. Gordon, Loanhead, Inch, Mare, "Jacinta" (20,003).
 3rd No. 484 John Macdonald, jun., Homewood, Inverness, Mare, "Polly."

Special Prize for best Pony in Class 70 under 13 hands—£5.

- No. 487 James Duncan, Fern Villa, Inverness, Mare, "Tes."

JUMPING COMPETITIONS

Wednesday, 26th July.

CLASS 1. HORSE or PONY, any height.—Premiums, £20, £15, £10, £5, and £3.

1. F. V. Grange, Alvaston, Nantwich, Cheshire, Gelding, "Rufus," chestnut.
2. F. V. Grange, Alvaston, Nantwich, Cheshire, "Hardcash."
3. Simon Andrews & Sons, Cardonald Grain Mills, Paisley, Gelding, "Ping Pong," brown.
4. Archibald Brown, Auchenhath Tile Works, near Hamilton, Gelding, "Kildare," brown, 8 years.
5. William Traill, Riding Academy, Aberdeen, "Aviator."

Thursday, 27th July.

CLASS 2. HORSE or PONY, any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in Class 1.—Premiums, £10, £8, £5, £3, and £2.

1. F. V. Grange, Alvaston, Nantwich, Cheshire, Gelding, "Rufus," chestnut.
2. Archibald Brown, Auchenhath Tile Works, near Hamilton, Gelding, "Kildare," brown, 8 years.
3. Simon Andrews & Sons, Cardonald Grain Mills, Paisley, Gelding, "Ping Pong," brown.
4. F. V. Grange, Alvaston, Nantwich, Cheshire, "Hardcash."
5. William Traill, Riding Academy, Aberdeen, "Aviator."

Friday, 28th July.

CLASS 3. HORSE or PONY, any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in either of Classes 1 or 2—4 inches extra for the winner of the two first prizes in Classes 1 and 2.—Premiums, £10, £8, £5, £3, and £2.

1. Simon Andrews & Sons, Cardonald Grain Mills, Paisley, Gelding, "Ping Pong," brown.
2. F. V. Grange, Alvaston, Nantwich, Cheshire, "Hardcash."
3. Archibald Brown, Auchenhath Tile Works, near Hamilton, Gelding, "Kildare," brown, 8 years.
4. F. V. Grange, Alvaston, Nantwich, Cheshire, "Hardcash."
5. Archibald Brown, Auchenhath Tile Works, near Hamilton, Gelding, "Prince," brown, 8 years.

Champion Prize for most points in Prizes with one or more Horses in above Classes—
First Prize to count five points; Second Prize, four points; Third Prize, three points; Fourth Prize, two points; and Fifth Prize, one point. The money to be evenly divided in the event of a tie.—Premium, £10.

F. V. Grange, Alvaston, Nantwich, Cheshire.

SHEEP

BLACKFACE.

PRESIDENT'S CHAMPION MEDAL for best pen of Blackface Sheep.

No. 637 Charles Howatson of Glenbuck, Glenbuck, N.B.

CLASS 71. TUP, above one Shear.—Premiums, £12, £8, £4, and £2.

- 1st No. 584 Cadzow & Alexander, Gadintrun, Old Kilpatrick.
- 2nd No. 587 M. G. Hamilton, Weelferds, Cobbinshaw, "Centenary Orphan."
- 3rd No. 588 Donald Macdougall, Claggan, Ardtalnaig, Loch Tay.
- 4th No. 591 Octavius Monkhouse, Cowhill, Wearhead, Co. Durham, "Sir Henry."
- H No. 592 John Robson, Newton, Bellingham.
- C No. 589 D. M. Macrae of Stenhouse, Thornhill, Dumfriesshire.

CLASS 72. SHEARLING TUP.—Premiums, £12, £8, £4, and £2.

- 1st No. 606 Donald Macdougall, Claggan, Ardtalnaig, Loch Tay.
 2nd No. 603 Charles Howatson of Glenbuck, Glenbuck, N.B.
 3rd No. 599 M. G. Hamilton, Woolfords, Cobbinshaw.
 4th No. 600 M. G. Hamilton, Woolfords, Cobbinshaw.
 V No. 605 Donald Macdougall, Claggan, Ardtalnaig, Loch Tay.
 H No. 602 Charles Howatson of Glenbuck, Glenbuck, N.B.
 C No. 604 Charles Howatson of Glenbuck, Glenbuck, N.B.

CLASS 73. EWE, above one Shear, with her Lamb at foot.—
Premiums, £10, £5, and £2.

- 1st No. 620 John Robson, Newton, Bellingham.
 2nd No. 616 Donald Macdougall, Claggan, Ardtalnaig, Loch Tay.
 3rd No. 621 John Robson, Newton, Bellingham.
 V No. 619 Octavius Monkhouse, Cowshill, Wearhead, Co. Durham.
 H No. 615 John M. Allan, Easter Duthil, Carr Bridge.
 C No. 618 Octavius Monkhouse, Cowshill, Wearhead, Co. Durham.

CLASS 74. SHEARLING EWE or GIMMER.—Premiums, £10, £5, and £2.

- 1st No. 628 John Robson, Newton, Bellingham.
 2nd No. 629 John Robson, Newton, Bellingham.
 3rd No. 626 Donald M. MacRae of Stenhouse, Thornhill, Dumfriesshire.
 V No. 624 John M. Allan, Easter Duthil, Carr Bridge.
 H No. 627 Octavius Monkhouse, Cowshill, Wearhead, Co. Durham.
 C No. 623 John M. Allan, Easter Duthil, Carr Bridge, Strathspey.

CLASS 75. BLACKFACE SHEARLING TUP, clipped on or after 1st March 1911.
Prizes, £12, £8, £4, and £2, given by Mr Charles Howatson of Glenbuck.

- 1st No. 637 Charles Howatson of Glenbuck, Glenbuck, N.B.
 2nd No. 636 M. G. Hamilton, Woolfords, Cobbinshaw.
 3rd No. 638 Charles Howatson of Glenbuck, Glenbuck, N.B.
 4th No. 635 M. G. Hamilton, Woolfords, Cobbinshaw.
 V No. 634 Hugh Cameron, Easter Causewayend, Kirknewton, Mid-Lothian.
 H No. 630 James Allan, Broomhill, Cawdor, Nairn.
 C No. 639 Robert Scott Meikle, Scotsburn, Kildary.

CHEVIOT.**PRESIDENT'S CHAMPION MEDAL for best Pen of Cheviot Sheep.**

- No. 654 John Elliot, Hindhope, Jedburgh.

Perpetual Challenge Cup, gifted by Mr Borthwick, value £25, for best Sheep in the Cheviot Classes,—given by the Cheviot Sheep Society.

- No. 654 John Elliot, Hindhope, Jedburgh.

CLASS 76. TUP, above one Shear.—Premiums, £12, £8, £4, and £2.

- 1st No. 644 John Elliot, Hindhope, Jedburgh.
 2nd No. 645 John Elliot, Hindhope, Jedburgh.
 3rd No. 646 John Elliot, Hindhope, Jedburgh.
 4th No. 647 Jacob Robson, Byrness, Otterburn, Northumberland.
 V No. 641 Dobson & Murray, Parkhall, Douglas, Lanarkshire, "Shelfhill Standard."

CLASS 77. SHEARLING TUP.—Premiums, £12, £8, £4, and £2.

- 1st No. 654 John Elliot, Hindhope, Jedburgh.
 2nd No. 658 John Robson, Millknowe, Duns.
 3rd No. 658 John Elliot, Hindhope, Jedburgh.
 4th No. 655 John Elliot, Hindhope, Jedburgh.
 V No. 660 John Robson, Millknowe, Duns.
 H No. 659 John Robson, Millknowe, Duns.

CLASS 78. EWE, above one Shear, with her Lamb at foot.—
Premiums, £10, £5, and £2.

- 1st No. 665 John Elliot, Hindhope, Jedburgh.
- 2nd No. 666 John Elliot, Hindhope, Jedburgh.
- 3rd No. 668 Jacob Robson, Byrness, Otterburn, Northumberland.
- V No. 670 John Robson, Millknowe, Duns, "Lady Liverpool."
- H No. 664 Wm. J. Dudgeon, Crakaig, Loth, Sutherland, "Crakaig Belle."
- C No. 669 Jacob Robson, Byrness, Otterburn, Northumberland.

CLASS 79. SHEARLING EWE or GIMMER.—Premiums, £10, £5, and £2.

- 1st No. 672 Dobson & Murray, Parkhall, Douglas, Lanarkshire.
- 2nd No. 683 John Robson, Millknowe, Duns.
- 3rd No. 677 John Elliot, Hindhope, Jedburgh.
- V No. 681 Jacob Robson, Byrness, Otterburn, Northumberland.
- H No. 673 Dobson & Murray, Parkhall, Douglas, Lanarkshire.
- C No. 682 John Robson, Millknowe, Duns.

BORDER LEICESTER.

PRESIDENT'S CHAMPION MEDAL for best Pen of Border Leicesters.

- No. 711 John Kinnaird, jun., Newmains, Stenton, Prestonkirk.

Gold Medal for best Animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book,—given by the Society of Border Leicester Sheep-Breeders.

- No. 711 John Kinnaird, jun., Newmains, Stenton, Prestonkirk.

CLASS 80. TUP, above one Shear.—Premiums, £12, £8, £4, and £2.

- 1st No. 688 R. G. Murray, Spittal, Biggar, "Smailholm Model" (2664).
- 2nd No. 689 Joseph G. Scott, Kinpurney Farm, Newtyle, "Lucky Duke."
- 3rd No. 687 J. Evelyn Carr, Scremerston Coal Co., Heathery Tops, Scremerston, Berwick-on-Tweed.
- 4th No. 686 James Campbell & Sons, Illieston, Mid-Calder.
- V No. 685 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk, "Home Pride."

CLASS 81. SHEARLING TUP.—Premiums, £12, £8, £4, and £2.

- 1st No. 711 John Kinnaird, jun., Newmains, Stenton, Prestonkirk.
- 2nd No. 695 Archibald Cameron & Sons, Westside Farm, Brechin.
- 3rd No. 699 J. Evelyn Carr, Heathery Tops, Scremerston, Berwick-on-Tweed.
- 4th No. 700 J. Evelyn Carr, Heathery Tops, Scremerston, Berwick-on-Tweed.
- V No. 712 John Kinnaird, jun., Newmains, Stenton, Prestonkirk.
- H No. 705 David P. Elliot, Nisbet Hill, Duns.
- C No. 694 Archibald Cameron & Sons, Westside Farm, Brechin.
- C No. 716 R. G. Murray, Spittal, Biggar.

CLASS 82. EWE, above one Shear.—Premiums, £10, £5, and £2.

- 1st No. 723 J. D. Hay, Glenearn, Bridge of Earn.
- 2nd No. 722 James Findlay, Newmill of Craigeassie, Forfar.
- 3rd No. 721 David P. Elliot, Nisbet Hill, Duns.
- V No. 720 J. Evelyn Carr, Heathery Tops, Scremerston, Berwick-on-Tweed.
- C No. 724 R. G. Murray, Spittal, Biggar.

CLASS 83. SHEARLING EWE or GIMMER.—Premiums, £10, £5, and £2.

- 1st No. 731 Archibald Cameron & Sons, Westside Farm, Brechin.
- 2nd No. 732 Archibald Cameron & Sons, Westside Farm, Brechin.
- 3rd No. 735 J. Evelyn Carr, Heathery Tops, Scremerston, Berwick-on-Tweed.
- H No. 737 David P. Elliot, Nisbet Hill, Duns.
- C No. 733 James Campbell & Sons, Illieston, Mid-Calder.
- C No. 734 James Campbell & Sons, Illieston, Mid-Calder.
- C No. 741 J. D. Hay, Glenearn, Bridge of Earn.

HALF-BRED.

PRESIDENT'S CHAMPION MEDAL for best Pen of Half-Breds.

No. 754 John Mark, Sunnyside, Prestonkirk.

CLASS 84. TUP, above one Shear.—Premiums, £12, £8, £4, and £2.

1st No. 751 D. & F. H. Porter, Doddington, Wooler.

2nd No. 750 John Arres-Mather, Delnies, Nairn.

CLASS 85. SHEARLING TUP.—Premiums, £12, £8, £4, and £2.

1st No. 754 John Mark, Sunnyside, Prestonkirk.

2nd No. 753 David P. Elliot, Nisbet Hill, Duns.

3rd No. 755 John Mark, Sunnyside, Prestonkirk.

4th No. 757 John Mark, Sunnyside, Prestonkirk.

V No. 756 John Mark, Sunnyside, Prestonkirk.

CLASS 86. EWE, above one Shear.—Premiums, £10, £5, and £2.

1st No. 761 David P. Elliot, Nisbet Hill, Duns.

2nd No. 762 D. & F. H. Porter, Doddington, Wooler.

3rd No. 763 John Stewart, Saughland, Tynehead.

V No. 764 John Stewart, Saughland, Tynehead.

H No. 759 John Arres-Mather, Delnies, Nairn.

C No. 760 John Arres-Mather, Delnies, Nairn.

CLASS 87. SHEARLING EWE or GIMMER.—Premiums, £10, £5, and £2.

1st No. 770 John Stewart, Saughland, Tynehead.

2nd No. 771 John Stewart, Saughland, Tynehead.

3rd No. 769 D. & F. H. Porter, Doddington, Wooler.

V No. 768 Thomas Douglas, Rhynie, Fearn.

H No. 765 John Arres-Mather, Delnies, Nairn.

C No. 767 Thomas Douglas, Rhynie, Fearn.

SHROPSHIRE.

PRESIDENT'S CHAMPION MEDAL for best Pen of Shropshires.

No. 774 Thomas A. Buttar, Corston, Coupar-Angus.

CLASS 88. SHEARLING TUP.—Premiums, £6, £4, and £2.

1st No. 774 Thomas A. Buttar, Corston, Coupar-Angus.

2nd No. 772 Thomas A. Buttar, Corston, Coupar-Angus.

3rd No. 775 Thomas A. Buttar, Corston, Coupar-Angus.

V No. 773 Thomas A. Buttar, Corston, Coupar-Angus.

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded:—

No. 776 Gordon R. Shiach, Ardgilzean, Elgin, "Donuil Dhu."

CLASS 89. SHEARLING EWE or GIMMER.—Premiums, £5, £3, and £2.

1st No. 777 Thomas A. Buttar, Corston, Coupar-Angus.

2nd No. 778 Thomas A. Buttar, Corston, Coupar-Angus.

3rd No. 779 Thomas A. Buttar, Corston, Coupar-Angus.

EXTRA STOCK.

The following was Very Highly Commended, and a Medium Silver Medal awarded:—

No. 782 Gordon R. Shiach, Ardgilzean, Elgin.

The following were Commended, and Bronze Medals awarded:—

No. 780 Gordon R. Shiach, Ardgilzean, Elgin.

No. 781 Gordon R. Shiach, Ardgilzean, Elgin.

OXFORD DOWN.

PRESIDENT'S CHAMPION MEDAL for best Pen of Oxford Downs.

No. 783 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

Best Shearling Oxford-Down Tup in Class 90 bred in Scotland, to be registered in Oxford-Down Flock-Book before prizes will be paid—£5, £3, and £2, given by Oxford-Down Sheep-Breeders' Association.

1st No. 783 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

2nd No. 788 William Elliot, Raecleugh Head, Duns.

3rd No. 789 William Elliot, Raecleugh Head, Duns.

CLASS 90. SHEARLING TUP.—Premiums, £6, £4, and £2.

1st No. 783 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

2nd No. 788 William Elliot, Raecleugh Head, Duns.

3rd No. 789 William Elliot, Raecleugh Head, Duns.

V No. 784 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

H No. 790 William Elliot, Raecleugh Head, Duns.

EXTRA STOCK.

The following was Commended, and a Bronze Medal awarded :—

No. 791 Thomas Douglas, Rhynie, Fearn.

CLASS 91. SHEARLING EWE or GIMMER.—Premiums, £5, £3, and £2.

1st No. 792 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

2nd No. 793 The Right Hon. A. J. Balfour, M.P., Whittingehame, Prestonkirk.

3rd No. 794 Thomas Douglas, Rhynie, Fearn.

SUFFOLK.

PRESIDENT'S CHAMPION MEDAL for best Pen of Suffolk Sheep.

No. 803 Allan Grant, Wester Alves, Alves, Forres.

CLASS 92. SHEARLING TUP.—Premiums, £6, £4, and £2.

1st No. 797 Allan Grant, Wester Alves, Alves, Forres.

2nd No. 796 Andrew B. Dalgety, Hilton of Guthrie, Guthrie.

3rd No. 798 Wm. Vivers & Sons, Dornocktown, Annan.

CLASS 93. SHEARLING EWE or GIMMER.—Premiums, £5, £3, and £2.

1st No. 799 Andrew B. Dalgety, Hilton of Guthrie, Guthrie.

2nd No. 802 Wm. Vivers & Sons, Dornocktown, Annan.

3rd No. 800 Allan Grant, Wester Alves, Alves, Forres.

CLASS 94. TUP LAMB.—Premiums, £5, £3, and £2, given by the Suffolk Sheep Society.

1st No. 803 Allan Grant, Wester Alves, Alves, Forres.

2nd No. 804 William Thomson, Tynet Mills, near Port Gordon.

3rd No. 805 Wm. Vivers & Sons, Dornocktown, Annan.

CLASS 95. THREE EWE LAMBS.—Premiums, £5, £3, and £2, given by the Suffolk Sheep Society.

1st No. 807 Allan Grant, Wester Alves, Alves, Forres.

2nd No. 808 William Thomson, Tynet Mills, near Port Gordon.

3rd No. 809 Wm. Vivers & Sons, Dornocktown, Annan.

FAT SHEEP.

CLASS 96. THREE FAT LAMBS, any Breed or Cross, dropped in the year of the Show.—Premiums, £5 and £3.

- 1st No. 813 Thomas Hay, Easter Rhynd, Bridge of Earn (Oxford-Down and Suffolk Tups, and Half-Bred and Border Leicester Ewes).
 2nd No. 815 Alexander Provan, Hilton, Perth (Suffolk Tup and Leicester Ewes).
 V No. 812 Andrew B. Dalgety, Hilton of Guthrie, Guthrie (Shropshire Tup and Border Leicester Ewes).
 No. 816 Major Stirling of Fairburn, Muir of Ord, N.B. (Oxford-Down Tup and Greyfaced Ewes).

EXTRA STOCK.

(*St Kilda Sheep*).

The following was Very Highly Commended, and a Medium Silver Medal awarded :—

- No. 820 The Lady Anne Murray, Courthill, Lochcarron (Ewe and Lamb).

The following was Commended, and a Bronze Medal awarded :—

- No. 817 The Lady Anne Murray, Courthill, Lochcarron (Tup).

SWINE

PRESIDENT'S CHAMPION MEDAL for best Pen of Swine.

- No. 823 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Turk VI." (12,975).

LARGE WHITE BREED.

CLASS 97. BOAR, farrowed before 1910.—Premiums, £6, £3, and £2.

- 1st No. 823 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Turk VI." (12,975).
 2nd No. 821 Robert D. Brown, The Groves, Old Auchinairn, Bishopbriggs, "King of the Groves."
 3rd No. 824 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh, "Craigcrook King II." (12,461).

CLASS 98. BOAR, farrowed in 1910.—Premiums, £6, £3, and £2.

- 1st No. 828 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Turk XXIV."
 2nd No. 829 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh, "Craigcrook King V."
 3rd No. 831 R. E. W. Stephenson, Tue Brook, Liverpool, "Wallace" (14,155).
 V No. 830 Thomas Simpson, Duddingston Farm, Portobello, "Earl of Worsley II."

CLASS 99. BOAR, farrowed in 1911.—Premiums, £4, £2, and £1.

- 1st No. 833 The Earl of Ellesmere, Worsley Hall, Manchester.
 2nd No. 837 Thomas Simpson, Duddingston Farm, Portobello.
 3rd No. 838 Thomas Simpson, Duddingston Farm, Portobello.
 V No. 832 The Earl of Ellesmere, Worsley Hall, Manchester.
 C No. 834 The Earl of Ellesmere, Worsley Hall, Manchester.
 C No. 835 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh.
 C No. 836 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh.
 C No. 839 R. E. W. Stephenson, Tue Brook, Liverpool.

CLASS 100. SOW, farrowed before 1910.—Premiums, £6, £3, and £2.

- 1st No. 845 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Marchington Queen I." (26,648.)
 2nd No. 848 R. E. W. Stephenson, Tue Brook, Liverpool, "Tallington Companion" (29,914).
 3rd No. 847 Thomas Simpson, Duddingston Farm, Portobello, "Duddingston Marchioness" (24,128).
 V No. 846 Thomas Simpson, Duddingston Farm, Portobello, "Dalmeny Lady Frost 46th" (20,762).

CLASS 101. SOW, farrowed in 1910.—Premiums, £6, £3, and £2.

- 1st No. 850 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Empress XXXVII."
 2nd No. 851 The Earl of Ellesmere, Worsley Hall, Manchester, "Worsley Miss XVIII."
 3rd No. 852 The Earl of Ellesmere, Worsley Hall, Manchester.
 V No. 854 Thomas Simpson, Duddingston Farm, Portobello, "Duddingston Madge."
 C No. 853 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh.

CLASS 102. SOW, farrowed in 1911.—Premiums, £4, £2, and £1.

- 1st No. 860 The Earl of Ellesmere, Worsley Hall, Manchester.
 2nd No. 866 Thomas Simpson, Duddingston Farm, Portobello.
 3rd No. 865 Thomas Simpson, Duddingston Farm, Portobello.
 V No. 867 R. E. W. Stephenson, Tue Brook, Liverpool.
 C No. 858 Robert D. Brown, The Groves, Old Auchinairn, Bishopbriggs.
 C No. 861 The Earl of Ellesmere, Worsley Hall, Manchester.
 C No. 863 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh.
 C No. 864 D. W. Gunn, Craigcrook Farm, Blackhall, Edinburgh.
 C No. 859 Robert D. Brown, The Groves, Old Auchinairn, Bishopbriggs.

BERKSHIRE.

CLASS 103. BOAR, any age.—Premiums, £6, £3, and £2.

- 1st No. 872 Samuel Sanday, Puddington Hall, Chester, "Puddington Royal Duke" (15,408).
 2nd No. 871 L. Currie, Minley Manor, Farnborough, Hants, "Minley Tom" (15,091).

CLASS 104. BOAR, farrowed in 1911.—Premiums, £4, £2, and £1.

- 1st No. 873 L. Currie, Minley Manor, Farnborough, Hants.
 2nd No. 876 Samuel Sanday, Puddington Hall, Chester.
 3rd No. 874 L. Currie, Minley Manor, Farnborough, Hants.

CLASS 105. SOW, any age.—Premiums, £6, £3, and £2.

- 1st No. 879 Samuel Sanday, Puddington Hall, Chester, "Puddington Daphane."
 2nd No. 880 Samuel Sanday, Puddington Hall, Chester, "Puddington Belle Dame."

CLASS 106. SOW, farrowed in 1911.—Premiums, £4, £3, and £1.

- 1st No. 882 L. Currie, Minley Manor, Farnborough, Hants.
 2nd No. 884 Samuel Sanday, Puddington Hall, Chester.
 3rd No. 881 L. Currie, Minley Manor, Farnborough, Hants.

POULTRY

First Premium—*One Sovereign*. Second Premium—*Ten Shillings*. Where there are Six or more Entries, Third Premium—*Five Shillings*.

CHAMPION MEDALS.

1. *Best Cock, any variety.*

No. 334 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave, Kyles of Bute.

2. *Best Hen, any variety.*

No. 31 Thomas Davidson, The Kennels, Drummur Castle, Keith.

3. *Best Cockerel, any variety.*

No. 157 Alexander M. Prain, Homelea, Errol.

4. *Best Pullet, any variety.*

No. 226 David Reid, Firthview, Portgordon.

5. *Best Pen of Ducks.*

No. 428 James Huntly & Sons, Hirsell Poultry Farm, Coldstream.

6. *Best Pen of Geese.*

No. 466 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire (Toulouse).

7. *Best Pen of Turkeys.*

No. 469 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Mammoth Bronze).

CLASS 1. DORKING—Coloured. Cock.

1st No. 1 Charles Aitkenhead, Stud Farm, Seaham Harbour.
2nd No. 3 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
V No. 4 John Mechie, Grain Merchant, Auchtermuchty.

CLASS 2. DORKING—Coloured. Hen.

1st No. 5 Charles Aitkenhead, Stud Farm, Seaham Harbour.
2nd No. 6 Thomas Davidson, The Kennels, Drummur Castle, Keith.
3rd No. 10 John Mechie, Grain Merchant, Auchtermuchty.
V No. 12 William Morgan, Balcurvie, Windygates.
H No. 7 James Huntly & Son, Hirsell Poultry Farm, Coldstream.

CLASS 3. DORKING—Coloured. Cockerel.

1st No. 15 William Marshall, Glenwhommie, Dunblane.
2nd No. 13 Charles Aikenhead, Stud Farm, Seaham Harbour.
3rd No. 19 Duncan M. Stewart, 66 Fort Street, Broughty Ferry.
V No. 17 John Mechie, Grain Merchant, Auchtermuchty.

CLASS 4. DORKING—Coloured. Pullet.

1st No. 20 Charles Aitkenhead, Stud Farm, Seaham Harbour.
2nd No. 21 William Charles, Gammons, Rothienorman.
V No. 23 Richardson Bros., Muir, Bannockburn.

CLASS 5. DORKING—Silver Grey. Cock.

1st No. 24 J. T. Cathcart, Pitcairrie, Newburgh, Fife.
2nd No. 28 George M'Bain, Linkwood, Elgin.
3rd No. 29 John Mechie, Grain Merchant, Auchtermuchty.
V No. 27 George M'Bain, Linkwood, Elgin.
H No. 25 J. T. Cathcart, Pitcairrie, Newburgh, Fife.

CLASS 6. DORKING—Silver Grey. Hen.

- 1st No. 31 Thomas Davidson, The Kennels, Drummuir Castle, Keith.
2nd No. 30 J. T. Cathcart, Pitcairrie, Newburgh, Fife.

CLASS 7. DORKING—Silver Grey. Cockerel.

- 1st No. 38 Thomas Davidson, The Kennels, Drummuir Castle, Keith.
2nd No. 40 George M'Bain, Linkwood, Elgin.
3rd No. 42 John Mechie, Grain Merchant, Auchtermuchty.
V No. 37 Alexander Cross of Knockdon, Maybole.

CLASS 8. DORKING—Silver Grey. Pullet.

- 1st No. 45 Thomas Davidson, The Kennels, Drummuir Castle, Keith.
2nd No. 48 George M'Bain, Linkwood, Elgin.
3rd No. 43 Charles Aitkenhead, Stud Farm, Seaham Harbour.
V No. 47 George M'Bain, Linkwood, Elgin.
H No. 46 Alexander Low, Gamekeeper's Cottage, Drum Castle, Drumoak.

CLASS 9. BRAHMAPOOTRA or COCHIN-CHINA. Cock.

- 1st No. 50 D. R. Bone, Fenwickland, Ayr (Cochin).
2nd No. 51 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Brahma).
V No. 52 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Brahma).

CLASS 10. BRAHMAPOOTRA or COCHIN-CHINA. Hen.

- 1st No. 56 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute (Brahma).
2nd No. 55 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Brahma).

CLASS 11. BRAHMAPOOTRA or COCHIN-CHINA. Cockerel.

No Entry.

CLASS 12. BRAHMAPOOTRA or COCHIN-CHINA. Pullet.

- 1st No. 57 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Cochin).

CLASS 13. SCOTCH GREY. Cock.

- 1st No. 60 Alexander Ollar, Kilkerran Cottage, Campbeltown.
2nd No. 61 William Ramsay, Muirhouse, Crosshouse, by Kilmarnock.
V No. 58 John Carswell, 148 Graham's Road, Falkirk.
H No. 59 J. T. Cathcart, Pitcairrie, Newburgh, Fife.

CLASS 14. SCOTCH GREY. Hen.

- 1st No. 64 William Ramsay, Muirhouse, Crosshouse, by Kilmarnock.
2nd No. 63 Alexander Ollar, Kilkerran Cottage, Campbeltown.
V No. 65 William Ramsay, Muirhouse, Crosshouse, by Kilmarnock.
H No. 62 David Hastings, Glaister Cottage, Darvel, Ayrshire.

CLASS 15. SCOTCH GREY. Cockerel.

- 1st No. 72 James Tweedie, Mouswald, Ruthwell, R.S.O.
2nd No. 69 David Hastings, Glaister Cottage, Darvel, Ayrshire.
3rd No. 68 Alexander Gonegal, Parkhouse Drive, Kilbirnie, Ayrshire.
V No. 67 Alexander Gonegal, Parkhouse Drive, Kilbirnie, Ayrshire.

CLASS 16. SCOTCH GREY. Pullet.

- 1st No. 75 William Ramsay, Muirhouse, Crosshouse, by Kilmarnock.
2nd No. 76 John Retson, Langside, Lanark.
V No. 74 David Hastings, Glaister Cottage, Darvel, Ayrshire.

CLASS 17. HAMBURG—Black. Cock.

- 1st No. 79 Charles E. Pickles, Kayfield House, Earby.
 2nd No. 78 Charles E. Pickles, Kayfield House, Earby.

CLASS 18. HAMBURG—Black. Hen.

- 1st No. 81 Charles E. Pickles, Kayfield House, Earby.
 2nd No. 80 David Govan, Lilybank, Stonehouse, Lanarkshire.

CLASS 19. HAMBURG—Any other Variety. Cock.

- 1st No. 85 Charles E. Pickles, Kayfield House, Earby (Silver Spangle).
 2nd No. 83 Allan King, Dubbs Cottage, Dalrymple (Gold Pencil).
 V No. 82 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (Silver Pencil).
 H No. 86 Charles E. Pickles, Kayfield House, Earby (Silver Spangle).

CLASS 20. HAMBURG—Any other Variety. Hen.

- 1st No. 90 Charles E. Pickles, Kayfield House, Earby (Silver Spangle).
 2nd No. 91 Charles E. Pickles, Kayfield House, Earby (Silver Pencil).
 V No. 89 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (Gold Pencil).
 H No. 88 David Govan, Lilybank, Stonehouse, Lanarkshire (Spangle).

CLASS 21. HAMBURG—Any Variety. Cockerel.

- 1st No. 92 David Govan, Lilybank, Stonehouse, Lanarkshire (Black).
 2nd No. 94 Chas. E. Pickles, Kayfield House, Earby (Black).
 V No. 93 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Black).

CLASS 22. HAMBURG—Any Variety. Pullet.

- 1st No. 95 David Govan, Lilybank, Stonehouse, Lanarkshire (Black).
 2nd No. 99 Charles E. Pickles, Kayfield House, Earby (Pencil).
 V No. 98 Charles E. Pickles, Kayfield House, Earby (Black).

CLASS 23. PLYMOUTH ROCK. Cock.

- 1st No. 103 Wm. Charles, Gammons, Rothienorman.
 2nd No. 104 W. H. Grassick, Daviot Branch Asylum, Pitcaple.
 V No. 102 Messrs Campbell, Drumgrier, Pinwherry, Ayrshire.

CLASS 24. PLYMOUTH ROCK. Hen.

- 1st No. 109 Andrew Leitch, The Cottage, Cameron Bridge, Windygates.
 2nd No. 110 Andrew Leitch, The Cottage, Cameron Bridge, Windygates.
 3rd No. 111 John Meikle, Camregan, Girvan.
 V No. 106 Wm. Charles, Gammons, Rothienorman.

CLASS 25. PLYMOUTH ROCK. Cockerel.

- 1st No. 115 Alex. M. Frain, Homelea, Errol.
 2nd No. 114 Andrew Leitch, The Cottage, Cameron Bridge, Windygates.
 V No. 112 Messrs Campbell, Drumgrier, Pinwherry, Ayrshire.
 H No. 113 Wm. Charles, Gammons, Rothienorman.

CLASS 26. PLYMOUTH ROCK. Pullet.

- 1st No. 118 Wm. Charles, Gammons, Rothienorman.
 2nd No. 119 Robert Cubby, Moorville, Carlisle.
 V No. 117 Messrs Campbell, Drumgrier, Pinwherry, Ayrshire.

CLASS 27. MINORCA. Cock.

- No. 123 William Binnie, Woodlands, Kilsyth.
 2nd No. 127 William Reith, Lower Middlefield, Woodside, Aberdeen.
 3rd No. 122 William Binnie, Woodlands, Kilsyth.
 V No. 125 Alex. M. Frain, Homelea, Errol.

CLASS 28. MINORCA. Hen.

- 1st No. 129 William Binnie, Woodlands, Kilsyth.
 2nd No. 128 William Binnie, Woodlands, Kilsyth.
 3rd No. 132 Alexander Macarthur, Texa Villa, Lochalsh Road, Inverness.
 V No. 133 John W. Matheson, Freeland, Gateside, Fife.

CLASS 29. MINORCA. Cockerel.

- 1st No. 140 Alexander M. Prain, Homelea, Errol.
 2nd No. 136 W. Binnie, Woodlands, Kilsyth.
 V No. 139 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute.

CLASS 30. MINORCA. Pullet.

- 1st No. 141 W. Binnie, Woodlands, Kilsyth.
 2nd No. 144 Alexander M. Prain, Homelea, Errol.
 V No. 143 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute.

CLASS 31. LEGHORN—White. Cock.

- 1st No. 147 Alexander M. Prain, Homelea, Errol.
 2nd No. 146 John W. Matheson, Freeland, Gateside.
 V No. 148 J. C. Ross, Stirling Road, Larbert.

CLASS 32. LEGHORN—White. Hen.

- 1st No. 151 John W. Matheson, Freeland, Gateside.
 2nd No. 152 Alexander M. Prain, Homelea, Errol.
 3rd No. 154 R. D. Pullar, Brahan, Perth.
 V No. 149 John King, Friarland, Ayr.

CLASS 33. LEGHORN—White.—Cockerel.

- 1st No. 157 Alexander M. Prain, Homelea, Errol.
 2nd No. 158 Alexander M. Prain, Homelea, Errol.
 V No. 159 R. D. Pullar, Brahan, Perth.
 H No. 156 John W. Matheson, Freeland, Gateside.

CLASS 34. LEGHORN—White. Pullet.

- 1st No. 163 John W. Matheson, Freeland, Gateside.
 2nd No. 166 J. C. Ross, Stirling Road, Larbert.
 3rd No. 167 J. C. Ross, Stirling Road, Larbert.
 V No. 161 Hugh Borthwick, Shielgreen, Peebles.

CLASS 35. LEGHORN—Any other Variety. Cock.

- 1st No. 168 Robert Durward, Dunecht, Aberdeenshire (Brown).
 2nd No. 171 Alexander M. Prain, Homelea, Errol (Brown).
 V No. 170 John W. Matheson, Freeland, Gateside (Brown).

CLASS 36. LEGHORN—Any other Variety. Hen.

- 1st No. 176 Miss Mary Peter, Springbank, Mannofield, Aberdeen (Brown).
 2nd No. 175 John W. Matheson, Freeland, Gateside (Brown).
 3rd No. 172 Miss Grace Burnett, Glamis Cottage, Spital, Aberdeen (Brown).
 V No. 174 Andrew Leitch, The Cottage, Cameron Bridge, Windygates (Black).

CLASS 37. LEGHORN—Any other Variety. Cockerel.

- 1st No. 181 Alexander M. Prain, Homelea, Errol (Brown).
 2nd No. 179 Andrew Leitch, The Cottage, Cameron Bridge, Windygates (Black).
 . V No. 178 Robert Durward, Dunecht, Aberdeenshire (Brown).

CLASS 38. LEGHORN.—Any other Variety. Pullet.

- 1st No. 184 Robert Durward, Dunecht, Aberdeenshire (Brown).
 2nd No. 187 Andrew Leitch, The Cottage, Cameron Bridge, Windygates (Black).
 V No. 185 Henry Kidd, 34½ Hall Street, Lochgelly (Brown).

CLASS 39. LANGSHAN. Cock.

- 1st No. 191 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute.
 2nd No. 189 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
 V No. 190 Duncan Baillie, Lochloy, Nairn.

CLASS 40. LANGSHAN. Hen.

- 1st No. 193 Richardson Brothers, Muir, Bannockburn.
 2nd No. 192 Duncan Baillie, Lochloy, Nairn.

CLASS 41. LANGSHAN. Cockerel.

- 1st No. 194 Alexander M. Prain, Homelea, Errol.
 2nd No. 195 Ben. Wilkinson, Towngate, Hipperholm, Yorks.

CLASS 42. LANGSHAN. Pullet.

- 1st No. 196 Alexander M. Prain, Homelea, Errol.

CLASS 43. ORPINGTON—Black. Cock.

- 1st No. 198 Lady Cowdray of Dunecht, Dunecht.
 2nd No. 202 David Reid, Firthview, Portgordon.
 2nd No. 201 Robert Niven & Son, Valleyfield, Culross, Dunfermline.
 V No. 197 J. T. Cathcart, Pitcairrie, Newburgh, Fife.
 H No. 203 David Reid, Firthview, Portgordon.
 C No. 204 Whitefield Brothers, Woodend, Arndale.

CLASS 44. ORPINGTON—Black. Hen.

- 1st No. 209 J. C. Ross, Stirling Road, Larbert.
 2nd No. 207 David Reid, Firthview, Portgordon.
 V No. 206 T. R. Leitch, Cameron Bridge, Windygates.
 H No. 208 David Reid, Firthview, Portgordon.
 C No. 205 Lady Cowdray of Dunecht, Dunecht.

CLASS 45. ORPINGTON—Black. Cockerel.

- 1st No. 210 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute.
 2nd No. 211 David Reid, Firthview, Portgordon.

CLASS 46. ORPINGTON—Black. Pullet.

- 1st No. 212 David Reid, Firthview, Portgordon.

CLASS 47. ORPINGTON—Buff. Cock.

- 1st No. 215 David Reid, Firthview, Portgordon.
 2nd No. 213 Robert Cubby, Moorville, Carlisle.
 V No. 216 David Reid, Firthview, Portgordon.
 H No. 214 R. D. Pullar, Brahan, Perth.

CLASS 48. ORPINGTON—Buff. Hen.

- 1st No. 217 William Morgan, Balcurvie, Windygates.
 2nd No. 218 David Reid, Firthview, Portgordon.

CLASS 49. ORPINGTON—Buff. Cockerel.

- 1st No. 219 Wm. Charles, Gammons, Rothienorman.
 2nd No. 221 David Reid, Firthview, Portgordon.
 V No. 220 David Reid, Firthview, Portgordon.

CLASS 50. ORPINGTON—Buff. Pullet.

- 1st No. 226 David Reid, Firthview, Portgordon.
 2nd No. 227 David Reid, Firthview, Portgordon.
 3rd No. 224 Robert Cubby, Moorville, Carlisle.
 V No. 225 R. D. Pullar, Brahan, Perth.
 H No. 223 Wm. Charles, Gammons, Rothienorman.

CLASS 51. ORPINGTON—Any other Variety. Cock.

- 1st No. 228 J. T. Cathcart, Pitcairrie, Newburgh, Fife (White).
 2nd No. 231 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 3rd No. 232 T. R. Leitch, Cameron Bridge, Windygates (White).
 V No. 229 J. T. Cathcart, Pitcairrie, Newburgh, Fife (White).

CLASS 52. ORPINGTON—Any other Variety. Hen.

- 1st No. 237 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 2nd No. 239 Alexander M. Prain, Homelea, Errol (White).
 3rd No. 235 J. T. Cathcart, Pitcairrie, Newburgh, Fife (White).

CLASS 53. ORPINGTON—Any other Variety. Cockerel.

- 1st No. 244 Alexander M. Prain, Homelea, Errol (White).
 2nd No. 242 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 3rd No. 241 Mrs Hilda H. Farquhar, St Margaret's, Bridge of Weir (White).
 V No. 245 David Reid, Firthview, Portgordon (White).
 H No. 243 T. R. Leitch, Cameron Bridge, Windygates (White).

CLASS 54. ORPINGTON—Any other Variety. Pullet.

- 1st No. 249 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 2nd No. 247 J. T. Cathcart, Pitcairrie, Newburgh, Fife (White).
 3rd No. 250 Alexander M. Prain, Homelea, Errol (White).
 V No. 251 David Reid, Firthview, Portgordon (White).
 H No. 248 Mrs Hilda H. Farquhar, St Margaret's, Bridge of Weir (White).
 C No. 252 Ben. Wilkinson, Towngate, Hipperholme, Yorks (White).

CLASS 55. WYANDOTTE—Gold or Silver. Cock.

- 1st No. 256 William Morgan, Balcurvie, Windygates (Gold).
 2nd No. 257 Charles E. Pickles, Kayfield House, Earby (Silver).
 V No. 255 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (Silver).
 H No. 253 John Aberdein, Glass, Huntly (Silver).

CLASS 56. WYANDOTTE—Gold or Silver. Hen.

- 1st No. 263 Charles E. Pickles, Kayfield House, Earby (Silver).
 2nd No. 258 Fred. Argo, 24 Beverley Road, Inverurie (Silver).
 3rd No. 260 D. R. Bone, Fenwickland, Ayr (Gold).
 V No. 262 William Morgan, Balcurvie, Windygates (Gold).

CLASS 57. WYANDOTTE—Gold or Silver. Cockerel.

- 1st No. 265 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (Gold).
 2nd No. 267 Charles E. Pickles, Kayfield House, Earby (Gold).
 V No. 266 William Morgan, Balcurvie, Windygates (Gold).
 H No. 264 Fred. Argo, 24 Beverley Road, Inverurie (Silver).

CLASS 58. WYANDOTTE—Gold or Silver. Pullet.

- 1st No. 269 D. R. Bone, Fenwickland, Ayr (Gold).
 2nd No. 268 Fred. Argo, 24 Beverley Road, Inverurie (Silver).
 V No. 271 Charles E. Pickles, Kayfield House, Earby (Silver).
 H No. 270 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (Silver).

CLASS 59. WYANDOTTE—Black or White. Cock.

- 1st No. 276 William Morgan, Balcurvie, Windygates (White).
 2nd No. 277 R. D. Pullar, Brahan, Perth (White).
 3rd No. 273 D. R. Bone, Fenwickland, Ayr (White).

CLASS 60. WYANDOTTE—Black or White. Hen.

- 1st No. 284 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 2nd No. 283 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Black).
 3rd No. 288 William Morgan, Balcurvie, Windygates (Black).
 V No. 280 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Black).
 H No. 285 Andrew Leitch, The Cottage, Cameron Bridge, Windygates (Black).

CLASS 61. WYANDOTTE—Black or White. Cockerel.

- 1st No. 303 John Wharton, Honeycott Farm, Hawes, Yorkshire (White).
 2nd No. 298 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 3rd No. 296 William Charles, Gammons, Rothienorman (White).
 V No. 301 Wm. Morgan, Balcurvie, Windygates (Black).
 H No. 297 W. H. Grassick, Davoit Branch Asylum, Pitcaple (White).
 C No. 299 A. H. S. Macgregor, Newton Poultry Farm, Auchtermuchty (White).

CLASS 62. WYANDOTTE—Black or White. Pullet.

- 1st No. 310 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
 Kyles of Bute (White).
 2nd No. 314 John Wharton, Honeycott Farm, Hawes, Yorkshire (White).
 3rd No. 309 W. H. Grassick, Davoit Branch Asylum, Pitcaple (White).
 V No. 306 D. R. Bone, Fenwickland, Ayr (White).
 H No. 311 Andrew Leitch, The Cottage, Cameron Bridge, Windygates (Black).
 C No. 305 W. Binnie, Woodlands, Kilsyth (Black).

CLASS 63. WYANDOTTE—Any other Variety. Cock.

- 1st No. 319 John Wharton, Honeycott Farm, Hawes, Yorkshire (Partridge).
 2nd No. 317 Robert Niven & Son, Valleyfield, Culross, Dunfermline (Partridge).
 V No. 315 William Morgan, Balcurvie, Windygates (Partridge).
 H No. 316 Robert Niven & Son, Valleyfield, Culross, Dunfermline (Partridge).

CLASS 64. WYANDOTTE—Any other Variety. Hen.

- 1st No. 323 David Reid, Firthview, Portgordon (Partridge).
 2nd No. 322 Robert Niven & Son, Valleyfield, Culross, Dunfermline (Partridge).
 3rd No. 325 John Wharton, Honeycott Farm, Hawes, Yorkshire (Blue).
 V No. 321 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Columbian).

CLASS 65. WYANDOTTE—Any other Variety. Cockerel.

- 1st No. 327 John Wharton, Honeycott Farm, Hawes, Yorkshire (Silver Pencil).
 2nd No. 326 John Wharton, Honeycott Farm, Hawes, Yorkshire (Partridge).

CLASS 66. WYANDOTTE—Any other Variety. Pullet.

- 1st No. 331 John Wharton, Honeycott Farm, Hawes, Yorkshire (Silver Pencil).
 2nd No. 328 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Columbian).
 V No. 330 John Wharton, Honeycott Farm, Hawes, Yorkshire (Partridge).

CLASS 67. INDIAN GAME. Cock.

- 1st No. 334 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute.
2nd No. 333 Walter Firth, Read, Blackburn.
V No. 332 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
H No. 335 Robert C. Liddell, Woodbine, Russell Street, Falkirk.

CLASS 68. INDIAN GAME. Hen.

- 1st No. 338 Walter Firth, Read, Blackburn.
2nd No. 339 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute.
V No. 340 R. D. Pullar, Brahan, Perth.
H No. 337 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.

CLASS 69. GAME—Old English. Cock.

- 1st No. 345 Walter Firth, Read, Blackburn.
2nd No. 341 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
3rd No. 342 J. T. Cathcart, Pitcairrie, Newburgh, Fife.
V No. 343 Isaac T. Dodd, The Wath Farm, Silloth, Cumberland.
H No. 344 James Drysdale, St Thomas, Cupar-Fife.

CLASS 70. GAME—Old English. Hen.

- 1st No. 347 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
2nd No. 350 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute.
3rd No. 349 Walter Firth, Read, Blackburn.
V No. 348 James Drysdale, St Thomas, Cupar-Fife.
H No. 351 A. D. Mackintosh, Raigmore, Inverness.
C No. 352 A. D. Mackintosh, Raigmore, Inverness.

CLASS 71. GAME—Modern. Cock.

- 1st No. 354 Walter Firth, Read, Blackburn.
2nd No. 355 Arthur Mackinnon, Helen Street, Forfar.
V No. 356 John Macpherson, 13 High Street, Dingwall.

CLASS 72. GAME—Modern. Hen.

- 1st No. 357 Walter Firth, Read, Blackburn.
2nd No. 360 David Reid, Firthview, Portgordon.
V No. 359 John Macpherson, 13 High Street, Dingwall.
H No. 358 Arthur Mackinnon, Helen Street, Forfar.

CLASS 73. GAME—Indian and Old English. Cockerel.

- 1st No. 363 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute.
2nd No. 361 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
V No. 362 Walter Firth, Read, Blackburn.
H No. 365 R. D. Pullar, Brahan, Perth.

CLASS 74. GAME—Indian and Old English. Pullet.

- 1st No. 368 Walter Firth, Read, Blackburn.
2nd No. 366 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire.
3rd No. 369 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave,
Kyles of Bute.
V No. 371 R. D. Pullar, Brahan, Perth.
H No. 367 James Drysdale, St Thomas, Cupar-Fife.

CLASS 75. BANTAM—Game, any Variety, including Old English and Indian Game. Cock.

- 1st No. 374 William Coutts, jun., Rosemount, Forfar (Black Red).
 2nd No. 376 Walter Firth, Read, Blackburn (Modern Pile).
 3rd No. 372 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Pile).
 V No. 375 Willie Cumming, 12 Wells Street, Inverness (Modern).
 H No. 373 J. T. Cathcart, Pitcairrie, Newburgh, Fife (Spangle).
 C No. 377 Ralph D. Moore, Deneshollow, Bearsden (Old English).

CLASS 76. BANTAM—Game, any Variety, including Old English and Indian Game. Hen.

- 1st No. 382 Walter Firth, Read, nr. Blackburn (Modern Pile).
 2nd No. 379 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Pile).
 3rd No. 383 James Hill, 18 Newmonthill, Forfar (Black Red).
 V No. 384 Ralph D. Moore, Deneshollow, Bearsden (Old English).
 H No. 380 William Coutts, jun., Rosemount, Forfar (Duckwing).
 C No. 381 Willie Cumming, 12 Wells Street, Inverness (Modern).

CLASS 77. BANTAM—Any other Variety Bantam. Cock.

- 1st No. 390 Charles E. Pickles, Kayfield House, Earby (Black).
 2nd No. 386 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave, Kyles of Bute (Pekin).
 3rd No. 387 James Huntly & Son, Hirshel Poultry Farm, Coldstream (Seabright).
 V No. 388 J. & J. Laing, Thirelstane, Lauder (Black Rosecomb).
 H No. 389 James M'Crae, 13 Thomson Street, Kilmarnock (Scotch Grey).
 C No. 391 Andrew Stillie, Ettrick Road, Selkirk (Black Rosecomb).

CLASS 78. BANTAM—Any other Variety Bantam. Hen.

- 1st No. 395 James Huntly & Son, Hirshel Poultry Farm, Coldstream (Seabright).
 2nd No. 397 Charles E. Pickles, Kayfield House, Earby (Black).
 3rd No. 394 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave, Kyles of Bute (Pekin).
 V No. 392 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Seabright).
 H No. 396 James M'Crae, 13 Thomson Street, Kilmarnock (Pekin).

CLASS 79. Any other recognised Breed of Poultry. Cock.

- 1st No. 402 Alex. M. Prain, Homelea, Errol (Rhode Island Red).
 2nd No. 401 Alex. Ollar, Kilkerran Cottage, Campbeltown (Spanish).
 V No. 399 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Andalusian).
 H No. 398 F. Anderson, Janefield Farm, Dunfermline (Houdan).
 C No. 400 Andrew MacIachlan, Westview, Beith (Andalusian).

CLASS 80. Any other recognised Breed of Poultry. Hen.

- 1st No. 404 Miss R. B. Babcock, Rimington, Clitheroe, Lancashire (Andalusian).
 2nd No. 405 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave, Kyles of Bute (Andalusian).
 V No. 406 Alex. Ollar, Kilkerran Cottage, Campbeltown (Spanish).
 H No. 403 F. Anderson, Janefield Farm, Dunfermline (Houdan).

CLASS 81. Any other recognised Breed of Poultry. Cockerel.

- 1st No. 408 William Coutts, jun., Rosemount, Forfar (Pile).
 2nd No. 409 Walter Firth, Read, Blackburn (Game Bantam).
 V No. 407 Fred. Addison, 76 West High Street, Inverurie (Rhode Island Red).

CLASS 82. Any other recognised Breed of Poultry. Pullet.

- 1st No. 411 William Coutts, jun., Rosemount, Forfar (Duckwing).
 2nd No. 412 Walter Firth, Read, Blackburn (Game Bantam).
 V No. 413 Thomas Hinshelwood, Mountain Meadow Poultry Farm, Colintrave, Kyles of Bute (Pekin).
 H No. 410 Fred. Addison, 76 West High Street, Inverurie (Rhode Island Red).
 C No. 414 John W. Matheson, Freeland, Gateside (Sussex).

CLASS 83. TABLE FOWLS—Any Breed or Cross, to be judged solely as Table Fowls, and without regard to fancy points. Pair of Cockerels.

- 1st No. 416 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Game and Orpington).
 2nd No. 415 Mrs Hilda H. Farquhar, St Margaret's, Bridge of Weir (Orpington).
 V No. 417 A. H. S. Macgregor, Newton Poultry Farm, Auchtermuchty (Sussex).
 H No. 419 John Mechie, Grain Merchant, Auchtermuchty (Sussex).

CLASS 84. TABLE FOWLS—Any Breed or Cross, to be judged solely as Table Fowls, and without regard to fancy points. Pair of Pullets.

- 1st No. 425 R. D. Pullar, Brahan, Perth (Indian Game and Buff Orpington Cross).
 2nd No. 422 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Game and Orpington).
 3rd No. 424 John Mechie, Grain Merchant, Auchtermuchty (Sussex).
 V No. 421 Mrs Hilda H. Farquhar, St Margaret's, Bridge of Weir (Orpington).
 H No. 423 John W. Matheson, Freeland, Gateside (Sussex Cross).
 C No. 420 John Aberdein, Glass, Huntly (Dorking and Orpington).

CLASS 85. DUCKS—Aylesbury. Drake.

- 1st No. 428 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 2nd No. 429 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 3rd No. 427 William Charles, Gammons, Rothienorman.
 V No. 426 George F. Barron, Thomastown, Auchterless.
 H No. 431 Mrs Thorburn, Glenormiston, Innerleithen.

CLASS 86. DUCKS—Aylesbury. Duck.

- 1st No. 434 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 2nd No. 435 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 3rd No. 432 William Charles, Gammons, Rothienorman.
 V No. 437 Mrs Thorburn, Glenormiston, Innerleithen.

CLASS 87. DUCKS—Aylesbury. Drake (Young).

- 1st No. 441 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 2nd No. 442 Mrs Thorburn, Glenormiston, Innerleithen.
 V No. 440 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 H No. 439 William Charles, Gammons, Rothienorman.
 C No. 438 George F. Barron, Thomastown, Auchterless.

CLASS 88. DUCKS—Aylesbury. Duck (Young).

- 1st No. 446 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 2nd No. 445 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 V No. 447 Mrs Thorburn, Glenormiston, Innerleithen.
 H No. 444 William Charles, Gammons, Rothienorman.
 C No. 443 George F. Barron, Thomastown, Auchterless.

CLASS 89. DUCKS—Rouen. Drake.

- 1st No. 448 James Huntly & Son, Hirsell Poultry Farm, Coldstream.

CLASS 90. DUCKS—Rouen. Duck.

- 1st No. 449 James Huntly & Son, Hirsell Poultry Farm, Coldstream.
 2nd No. 451 John Meikle, Camregan, Girvan.
 V No. 450 James Huntly & Son, Hirsell Poultry Farm, Coldstream.

CLASS 91. DUCKS—Any other Variety. Drake.

- 1st No. 454 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Pekin).
 2nd No. 455 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Buff Orpington).
 V No. 453 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Indian Runner).
 H No. 452 James Douglas Fletcher of Rosehaugh, Avooch, Ross-shire (Pekin).

CLASS 92. DUCKS—Any other Variety. Duck.

- 1st No. 456 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Rouen).
 2nd No. 457 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Rouen).

CLASS 93. DUCKS—Any Variety (Aylesbury excepted). Drake (Young).

- 1st No. 459 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Rouen).
 2nd No. 458 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Indian Runner).
 V No. 460 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Buff Orpington).

CLASS 94. DUCKS—Any Variety (Aylesbury excepted). Duck (Young).

- 1st No. 462 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Rouen).
 2nd No. 463 James Huntly & Son, Hirsell Poultry Farm, Coldstream (Buff Orpington).
 V No. 461 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Indian Runner).

CLASS 95. GEESE. Gander.

- 1st No. 464 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire (Toulouse).

CLASS 96. GEESE. Goose.

- 1st No. 466 James Douglas Fletcher of Rosehaugh, Avoch, Ross-shire (Toulouse).

CLASS 97. TURKEYS. Cock.

- 1st No. 469 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Mammoth Bronze).
 2nd No. 467 Walter Clark, Hilton, Delnies, Nairn (American Mammoth Bronze).
 V No. 470 Anderson Munro, Ashton, Inverness (American Mammoth Bronze).

CLASS 98. TURKEYS. Hen.

- 1st No. 471 George F. Barron, Thomastown, Auchterless (Mammoth Bronze).
 2nd No. 472 Walter Clark, Hilton, Delnies, Nairn (American Mammoth Bronze).
 V No. 474 W. H. Grassick, Daviot Branch Asylum, Pitcaple (Mammoth Bronze).

DAIRY PRODUCE**CLASS 1. POWDERED BUTTER, not less than 7 lb.—Premiums, £4, £2, and £1.**

- 1st No. 11 Joseph B. Taylor, Kildrum Farm, Cumbernauld.
 2nd No. 10 Miss Shanks, Broomhill Farm, Denny.
 3rd No. 8 William Rennie, Parkhead, Slamannan.
 H No. 1 Alex. Cook, Burnhouse, Denny.
 C No. 5 C. Jackson, Orchardton, Condorrat.

CLASS 2. FRESH BUTTER, Three 1 lb. Rolls.—Premiums, £4, £2, and £1.

- 1st No. 24 Joseph P. Taylor, Kildrum Farm, Cumbernauld.
 2nd No. 21 William Rennie, Parkhead, Slamannan.
 3rd No. 14 Alex. Cook, Burnhouse, Denny.
 V No. 23 Miss Shanks, Broomhill Farm, Denny.
 H No. 18 C. Jackson, Orchardton, Condorrat.

CLASS 3. CHEDDAR CHEESE, 56 lb. and upwards.—Premiums, £6, £4, £2, and £1.

- 1st No. 28 J. C. Cuninghame, Dunragit.
 2nd No. 35 Arnold W. Saunders, Dromore Farm, Kirkcudbright.
 3rd No. 29 J. C. Cuninghame, Borland.
 4th No. 27 Alex. Cross, of Knockdon, Maybole.
 V No. 25 William Barron, Craigdon Dairy, Castle-Douglas.
 H No. 26 John H. Barrowman, Corrahill, Kirkcudbright.
 C No. 34 W. H. Ralston, Dunragit Estate Office, Dunragit.

CLASS 4. SWEET MILK CHEESE, flat shape, white in colour, made according to the Dunlop or other method.—Premiums, £3, £2, and £1.

- 1st No. 41 Robert Stevenson, Boghead, Galston.
 2nd No. 40 William G. Plunkett, Myremill Dairy, Maybole.
 3rd No. 39 John R. Miller, Midkelton, Castle-Douglas.

JUDGES

Shorthorn.—James Durno, Rothiebrishbane, Fyvie; Jas. Peter, Berkeley Castle Estate Office, Berkeley.

Aberdeen-Angus.—Alex. Beddie, Adziel, Strichen; Alex. Strachan, Wester Fowls, Alford, Aberdeenshire.

Galloway.—W. A. M'Turk, Barlae, Dalry, Galloway.

Highland.—Peter M'Intyre, Tighnabla, Comrie.

Ayrshire.—Jas. Wallace, Chapelhill, Kirkcudbright.

Fat Cattle and Fat Sheep.—A. MacDonald, Balintore, Kirkhill, Inverness.

Draught Mares and Fillies.—Jas. Barrie, Balmedie, Aberdeen; Alexander Clark, Newton Farm, Markinch; John Hannah, Girvan Mains, Girvan.

Draught Stallions, Entire Colts, and Geldings.—John Kerr, Red Hall, Wighton, Cumberland; Robt. M'Alister, Mid Ascog, Rothesay; Robt. Park, Brunstane, Portobello.

Hunters.—Wm. Taylor, Park Mains, Renfrew.

Hackneys, Harness Horses, and Ponies.—C. Edward E. Cooke, Bygrave House, near Baldock, Herts.

Highland Ponies.—Lord Arthur Cecil, The Mount, Lymington, Hants.

Shetland Ponies.—Walter Aitchison, Coniccleugh, Huntly; F. N. M. Gourlay, Broomfield, Moniaive.

Blackface.—William W. Anderson, junr., Colzium, Kirknewton; Alexander Cowan, Spittalhill, Fintry; Archibald Whyte, Inverquhar, Kirriemuir.

Cheviot.—James Moffat, Craik, Hawick; Charles Scott, Milsington, Hawick.

Border Leicester.—Robt. Anderson, Fingask House, Old Meldrum; James Whyte, Hayston, Glamis.

Half-Bred.—J. R. C. Smith, Mowhaugh, Kelso.

Shropshire, Oxford Down, and Suffolk.—Alfred Mansell, College Hill, Shrewsbury.

Swine.—Sanders Spencer, Holywell Manor, St Ives.

Poultry.—R. Anthony, Euxton, Chorley, Lancashire (Classes 9 to 12 inclusive, Classes 39 to 54 inclusive, and Classes 67 to 94 inclusive); Wm. Stewart, Home Farm, Fyvie Castle, Fyvie (Classes 1 to 8 inclusive, 13 to 38 inclusive, 55 to 66 inclusive, and 95 to 98 inclusive).

Dairy Produce.—Hugh Affleck, 35 Wilson Street, Glasgow.

II.—VETERINARY DEPARTMENT.

CLASS EXAMINATIONS—1911.

Silver Medals were awarded to the following:—

ROYAL (DICK) VETERINARY COLLEGE.

Chemistry	R. Simpson, Edinburgh.
Biology	Thos. Dalling, Edinburgh.
Junior Anatomy	Thos. Dalling, Edinburgh.
Senior Anatomy	J. W. Hayes, Edinburgh.
Physiology	J. W. Hayes, Edinburgh.
Stable Management	F. Christopher, Co. Durham.
Pathology and Bacteriology	W. W. Pegg, Edinburgh.
Materia Medica	W. W. Pegg, Edinburgh.
Hygiene and Dietetics	S. Littler, Newark.
Veterinary Surgery	H. L. Torrance, Shotts.
Veterinary Medicine	H. L. Torrance, Shotts.

GLASGOW VETERINARY COLLEGE.

Chemistry	Eric E. MacLachlan, Glasgow.
Biology	Eric E. MacLachlan, Glasgow.
Junior Anatomy	William Watt, Wishaw.
Senior Anatomy	Englebert F. Angler, Fort William.
Physiology	James M. Dawson, Glasgow.
Stable Management	Tom T. Taylor, Saltcoats.
Pathology and Bacteriology	David Keir, Paisley.
Materia Medica	David Keir, Paisley.
Hygiene and Dietetics	David Keir, Paisley.
Veterinary Surgery	Hugh M. Johnston, Newton Mearns.
Veterinary Medicine	Hugh M. Johnston, Newton Mearns.

22 Large Silver Medals, £14, 0s. 6d.

III.—DISTRICT COMPETITIONS, 1911.

19 Districts—Grants of £12 each (Section I.) (less £1, 5s. not awarded)	£226 15 0
12 " Grants of £15 each (Section II.)	180 0 0
9 " Special Grants, £128; Medals, £7, 19s. 6d.	135 19 6
28 " Medals for Shows (61 Large, 5 Medium)	41 0 3
13 " Medals for Cottages and Gardens (20 Minor, 2 Medium)	5 13 8
200 " Medals for Ploughing, 1910-11	48 6 8
<u>281</u>	<u>£637 15 1</u>

ABSTRACT OF PREMIUMS.

Inverness Show	£2501 16 1
District Competitions	637 15 1
Veterinary Colleges	14 0 6
	£3153 11 8

DUMFRIES SHOW, 1910.

ALTERATIONS IN PRIZE LIST.

On account of animals failing to comply with the Regulations as to calving, foaling, and farrowing, the following changes have taken place in the list of animals for which prizes were paid :—

CATTLE

SHORTHORN.

CLASS 5. HEIFER, calved in 1908.—Premiums, £10, £5, £3, and £2.

- | | |
|------------|---|
| No. 45 | J. Deane Willis, Bapton Manor, Codford St Mary, Wilts., "Fairy Princess." |
| 1st No. 40 | Wm. T. Malcolm, Dunmore, Larbert, "Dunmore Garland." |
| 2nd No. 38 | George Harrison, Gainford Hall, Darlington, "Ruth of Gainford." |
| 3rd No. 37 | George Harrison, Gainford Hall, Darlington, "Gainford Fairy." |
| V No. 42 | Lord Polwarth, Mertoun House, St Boswells, "Fancy Sowerby." |

GALLOWAY.

CLASS 17. HEIFER, calved on or after 1st December 1907.—Premiums, £10, £5, £3, and £2.

- | | |
|-------------|---|
| 1st No. 141 | Robert Graham, Auchengassel, Twynholm, "Kitty of Auchengassel" (21,131). |
| 2nd No. 138 | Arthur H. Fox-Brockbank, The Croft, Kirksanton, Silecroft, Cumberland, "Esmee of Blackcombe" (21,418). |
| 3rd No. 142 | T. & R. Graham, Craigs Farm and Chapel Logan, Dumfries, "Louisa 8th of Tarbreoch" (21,125). |
| * No. 144 | J. M. Kennedy of Knocknalling, Dalry, Galloway, "Myrtle" (21,106). |
| * No. 139 | Francis N. M. Gourlay, Bloomfield, Moniaive, Dumfriesshire, "Favourite 2nd of Craigneston" (19,849). |
| 4th No. 140 | Francis N. M. Gourlay, Broomfield, Moniaive, Dumfriesshire, "Flavia 2nd of Craigneston" (19,850). |
| C No. 137 | Sir Robert W. Buchanan-Jardine of Castlemilk, Bart., Lockerbie, "Novelette II. of Castlemilk" (19,786). |
| C No. 143 | William Graham, Harelaw Hill, Canonbie, "Glengowan" (21,484). |

The animals failing to qualify are marked thus ().*

AYRSHIRE.

CLASS 30. COW of any age, in Calf, or HEIFER, calved in 1907, in Calf and due to calve within nine months after the Show.—Premiums, £10, £7, and £3.

- 1st No. 257 John Murray, Carston, Ochiltree, "Carston Lady Mary Stuart" (19,193).
 2nd No. 255 Henry Keswick, Cowhill Tower, Holywood, Dumfries, "Favourite" (22,074).
 No. 252 Crichton Royal Institution, Crichton Farm, Dumfries, "Crichton Beauty 3rd" (16,475).
 3rd No. 232 Thomas Brown, Drum, Thornhill, "Rosebud" (22,195).
 H No. 254 Alex. Cross, Knockdon, Maybole, "Bridesmaid IV." (19,089).
 C No. 253 Crichton Royal Institution, Crichton Farm, Dumfries, "Crichton Ella 7th" (20,909).

HORSES

DRAUGHT MARES AND FILLIES.

CLASS 41. YELD MARE, foaled before 1907.—Premiums, £12, £9, £6, and £4.

- No. 397 Stephen Mitchell of Boquhan, Kippen Station, "Boquhan Lady Peggy."
 1st No. 394 J. E. Kerr of Harviestoun Castle, Dollar, "Nerissa."
 2nd No. 399 John P. Sleigh, St John's Wells, Fyvie, "Lucilla."
 3rd No. 396 Stephen Mitchell of Boquhan, Kippen Station, "Minniewawa" (21,620).
 4th No. 393 Robert Chapman, Johnston, Gartcosh, "Winsome Baroness."
 H No. 392 James Cameron, Lincluden Mains, Dumfries, "Lady Edward."

SWINE.

LARGE WHITE BREED.

CLASS 108. SOW, farrowed in 1909.—Premiums, £6, £3, and £2.

- 1st No. 948 James Wylie, Mayfield Farm, Stevenston, "Worsley Hawthorn XLVII."
 * No. 943 David W. Gunn, Craigcrook Farm, Blackhall, Edinburgh, "Craigcrook Daisy."
 2nd No. 944 Thomas Simpson, Duddingston Mains, Portobello, Edinburgh, "Duddingston Marchioness."
 3rd No. 945 R. E. W. Stephenson, Tue Brook, Liverpool, "Wyboston Alicia" (26,702).

The animals failing to qualify are marked thus ().*

STATE OF THE FUNDS
OF
THE HIGHLAND AND AGRICULTURAL SOCIETY
OF SCOTLAND

As at 30th NOVEMBER 1911.

I. INVESTED IN CONSOLS, HERITABLE BONDS, DEBENTURE AND PREFERENCE RAILWAY STOCKS, BANK STOCKS, &c.	£105,781 17 1
II. ESTIMATED VALUE of Buildings, No. 3 George	
IV. Bridge	£3,100 0 0
III. ESTIMATED VALUE of Furniture, Paintings, Books, &c.	1,000 0 0
IV. MEMBERS' NEW PAVILION—Balance of Cost	106 15 0
	4,206 15 0
V. ARREARS OF SUBSCRIPTIONS considered recoverable	180 4 0
VI. BALANCES at 30th November 1911 DUE BY ROYAL BANK OF SCOTLAND ON ACCOUNTS CURRENT—less Balance due to Secretary	1,010 7 0
AMOUNT OF GENERAL FUNDS	£111,179 3 1
VII. TWEEDDALE MEDAL FUND—	
Heritable Bond, at $3\frac{1}{4}$ per cent	£500 0 0

ARCHD. BUCHAN HEPBURN, *Chairman of Directors.*
ALEXANDER CROSS, *Director.*
WM. HOME COOK, C.A., *Auditor.*

EDINBURGH, 10th January 1912.

ABSTRACT of the ACCOUNTS of the HIGHLAND and CHARGE.

1. BALANCES due by Royal Bank of Scotland on Account Current, at 30th November 1910				£3,992	6	0
2. ARREARS of Subscriptions outstanding at 30th November 1910				£141	16	0
Whereof due by Members who have compounded for life, and whose arrears are thereby extinguished	£3	0	0			
Sums ordered to be written off	54	11	6			
				57	11	6
						84 4 6
3. INTERESTS AND DIVIDENDS—						
(1) Interests—						
On Heritable Bonds, less Income-tax			£683	18	0	
On Railway Debenture and Preference Stocks, do.			1,540	13	2	
On Colonial Government Stocks, do.			164	16	0	
On Annuity Stocks, do.			69	13	6	
On Deposit-Receipts with Edinburgh Corporation, do.			59	19	11	
						£2,519 0 7
(2) Dividends—						
On Consols, less Income-tax.	£94	3	4			
On Bank Stocks	1,216	19	3			
				1,311	2	7
						3,830 3 2
4. SUBSCRIPTIONS—						
Annual Subscriptions			£1,434	14	0	
Life Subscriptions			619	16	0	
						2,054 10 0
5. TRANSACTIONS						40 19 7
6. RECEIPT on Account of Dumfries Show						0 5 0
7. RECEIPTS from Inverness Show						6,229 8 2
8. INVESTMENTS REALISED						5,800 0 0
9. INCOME-TAX repaid for year to 5th April 1911						237 10 6
10. MISCELLANEOUS						2 18 8

SUM OF CHARGE

£22,272 5 7

EDINBURGH, 10th January 1912.

AGRICULTURAL SOCIETY of SCOTLAND for the Year 1910-1911.

DISCHARGE.

1. ESTABLISHMENT EXPENSES—			
Salaries and Wages—Secretary, £900; Clerk, £300; Second Clerk, £237, 10s.; Third Clerk, £112, 10s.; Messengers, £87	.	.	£1,637 0 0
Fee-duty, £28; Taxes, £50, 6s. 8d.	.	.	78 6 8
Coals, Gas, and Electric Light	.	.	32 2 5
Repairs and Furnishings, £68, 8s. 8d.; Insurances, £18, 2s. 3d.	.	.	81 5 11
			<u>£1,828 15 0</u>
2. FEE to Auditor of Accounts for 1909-1910	.	.	75 0 0
3. EDUCATION—			
Forestry—			
Vote to Lectureship in Edinburgh University	.	£50 0 0	
Expenses of Examination	.	26 15 1	
		<u>£76 15 1</u>	
Agriculture—			
Expenses of National Diploma Examination	.	118 19 9	105 14 10
4. CHEMICAL DEPARTMENT—			
Fee to Chemist	.	£50 0 0	
Chemist's Fees for Analyses to Members, and Expenses	.	101 13 9	
		<u>£151 13 9</u>	
Expenses of Manuring and Sheep-Grazing Experiments, £75.—Less Grant from Board of Agriculture, £50	.	25 0 0	
Pasture Experiments—Travelling Expenses and Outlays	.	11 10 7	
			<u>188 4 4</u>
5. VETERINARY DEPARTMENT—			
Medals to Students	.	.	14 0 6
6. BOTANICAL DEPARTMENT—			
Fee to Botanist for year	.	£25 0 0	
Testing Samples of Seeds for Members	.	28 16 0	
			<u>53 16 0</u>
7. DAIRY DEPARTMENT—			
Expenses of Examination at Kilmarnock, £108, 13s. 5d., less Entry Fees, £37	.	£71 13 5	
Milk Record Scheme	.	200 0 0	
			<u>271 13 5</u>
8. EXPENSES in connection with Trials of Potato Diggers—			
Premiums awarded, £42; Outlays, £10, 16s.	.	.	52 16 0
9. EXPENSES in connection with Inspection of Sites for Show of 1912—			
Travelling Expenses and Outlays	.	.	24 8 0
			<u>798 11 9</u>
10. SOCIETY'S TRANSACTIONS			
ORDINARY Printing, £61, 0s. 3d.; Advertising, £16, 15s. 1d.; Stationery, Books, &c., £41, 12s. 10d.; Postages, &c., £70; Bank Charges, &c., £7, 11s. 11d.	.	.	197 0 1
12. FEE to Consulting Engineer			
	.	.	25 0 0
13. GRANTS to Public Societies—Scottish Meteorological Society, £20; Society for Prevention of Cruelty to Animals, £5			
	.	.	25 0 0
14. SPECIAL DONATIONS—			
Royal Dick Veterinary College	.	£400 0 0	
Glasgow Veterinary College	.	100 0 0	
Fund raised to meet expenses of Case of Stewart v. Williamson	.	50 0 0	
			<u>550 0 0</u>
15. MISCELLANEOUS PAYMENTS			
	.	.	111 2 3
16. INVESTMENTS made			
	.	.	7,906 16 0
17. EXTRAORDINARY EXPENDITURE—			
Purchase Price of Annuity for First Clerk	.	£1,271 5 0	
Premium on Deferred Annuity for behoof of Secretary	.	189 10 0	
			<u>1,460 15 0</u>
18. PAYMENTS on Account of 1910—			
Dumfries Show	.	£151 8 0	
Extra Remuneration to Clerks during Secretary's absence	.	75 0 0	
			<u>226 3 0</u>
19. PAYMENTS in connection with Inverness Show—Premiums, £2366, 16s. 1d.; General Expenses, £4029, 5s. 8d.			
	.	.	6,396 1 9
20. PREMIUMS for Local Shows and District Competitions			
	.	.	616 11 8
21. ARREARS of Subscriptions struck off as irrecoverable			
	.	.	64 5 0
22. ARREARS outstanding at 30th November 1911			
	.	.	180 4 0
23. BALANCES at 30th November 1911 with Royal Bank of Scotland on Account Current—			
Edinburgh Account	.	£875 17 0	
London Account	.	135 0 0	
		<u>£1,010 17 0</u>	
Less Balance due to Secretary	.	0 10 0	
			<u>1,010 7 0</u>
SUM OF DISCHARGE			<u><u>£22,272 5 7</u></u>

ARCHD. BUCHAN HEPBURN, *Chairman of Directors.*

ALEXANDER CROSS, *Director.*

WM. HOME COOK, C.A., *Auditor.*

ABSTRACT of the ACCOUNTS

CHARGE.

1. LOCAL SUBSCRIPTIONS—

Inverness-shire Voluntary Assessment	£739 10 0
Ross-shire and Cromartyshire do.	313 15 0
Nairnshire (not yet received) do.	0 0 0
Caithness-shire do.	67 14 4
Sutherlandshire (did not contribute)	0 0 0
Morayshire—General Subscription	2 16 4
Town of Inverness—Donation	52 10 0
Highland Railway Company do.	50 0 0
Duke of Sutherland do.	25 0 0
Andrew Carnegie of Skibo do.	25 0 0
Sir George Bullough of Rum do.	5 0 0
Black Isle Farmers' Society do.	20 0 0
Nairnshire Farmers' Society do.	20 0 0
Inverness-shire Farmers' Society do.	25 0 0
Wester Ross Farmers' Club do.	25 0 0
	£1,371 5 8

2. AMOUNT COLLECTED DURING SHOW—

Drawn at Gates	£2,025 6 0
Drawn at Grand Stand	844 17 9
Catalogues and Awards sold	174 5 5
Cloak-Room and Lavatories	6 6 9
	2,550 15 11
3. FORAGE SOLD	8 2 1
4. RENT OF STALLS	1,840 1 6
5. RENT OF REFRESHMENT BOOTHS	200 0 0
6. ADVERTISEMENTS IN CATALOGUE AND PREMIUM LIST	68 9 9
7. SUBSCRIPTIONS IN AID OF PREMIUM LIST	163 10 0
8. INCOME FROM TWEEDDALE MEDAL FUND	16 9 6
9. INTEREST FROM DEPOSIT RECEIPTS	10 13 9
	£6,229 8 2
BALANCE OF PAYMENTS	166 13 7
	£6,396 1 9

Note.—To the above balance of	£166 13 7
There must be added—	
Premiums undrawn at 30th November 1911, amounting to	185 0 0
	£301 13 7
Less Amount of Subscription to be received from Nairnshire, estimated at	20 0 0
Making the probable Loss	£281 13 7

of the INVERNESS SHOW, 1911.

DISCHARGE.**1. SHOWYARD EXPENDITURE—**

Fitting up Showyard, £2373, 14s., <i>less</i> seven-eighths of cost of Members' New Pavilion, £106, 15s., transferred to ordinary account	£2,266 19 0	
Rosettes, £31, 19s. 1d.; Storing and Repairing Turnstiles, £8, 8s. 8d.	40 7 9	
Penning, &c., of Poultry, £12, 2s. 6d.; Miscellaneous, £5, 13s.	17 15 6	
Railway Carriages, &c.	26 16 0	
Decorating Members' Pavilion and Directors' Room	22 0 0	
		£2,373 18 3
2. FORAGE		238 19 10
3. POLICE		41 17 6
4. TRAVELLING EXPENSES of Judges, Stewards, &c.		172 2 3
5. HOTEL AND LUNCHEONS—		
Hotel Bills for 27 Directors, 7 Stewards, 31 Judges, &c.	£166 5 3	
Luncheons and Breakfasts, &c., in Showyard for Directors, Judges, Attending Members, &c.	176 14 6	
		342 19 9
6. MUSIC		90 0 0
7. PRINTING		252 18 11
8. ADVERTISING and Bill-posting		145 5 10
9. HIGHLAND INDUSTRIES		6 10 0
10. CONCERT for Attendants		2 2 6
11. FORESTRY EXHIBITION		16 10 0
12. TREASURER		25 0 0
13. ENGINEER		25 0 0
14. VETERINARY INSPECTION		10 10 0
15. ASSISTANTS and Attendants		208 11 5
16. POSTAGES		55 0 0
17. MISCELLANEOUS		21 19 5
AMOUNT OF GENERAL EXPENDITURE		£4,029 5 8
18. PREMIUMS drawn at 30th November		2,366 16 1
		£6,396 1 9

ARCHD. BUCHAN HEPBURN, *Chairman of Directors.*
ALEXANDER CROSS, *Director.*
WM. HOME COOK, C.A., *Auditor.*

ABSTRACT of the ACCOUNTS of the

CHARGE.

I. FUNDS as at 30th November 1910—

Amount on Heritable Bond, at $3\frac{1}{2}$ per cent	£3,500	0	0
£3,193, 6s. 8d. North British Railway Company 3 per cent Debenture Stock, purchased at	2,650	0	0
£550 Lancashire and Yorkshire Railway Company 3 per cent Debenture Stock, purchased at	611	10	6
£190 London and North-Western Railway Company 4 per cent Guaranteed Stock, purchased at	259	1	11
	£7,020	12	5
BALANCE in Royal Bank on Account Current	519	3	6
	£7,539	15	11

II. INTEREST ON INVESTMENTS—

On £3,500 on Heritable Bond at $3\frac{1}{2}$ per cent, £122, 10s., less tax £7, 2s. 10d. . . .	£115	7	2
On £3,193, 6s. 8d. North British Railway Company 3 per cent Debenture Stock, £95, 16s., less tax £5, 11s. 10d. . . .	90	4	2
On £550 Lancashire and Yorkshire Railway Com- pany 3 per cent Debenture Stock, £16, 10s., less tax 19s. 4d. . . .	15	10	8
On £190 London and North-Western Rail- way Company 4 per cent Guaranteed Stock, £7, 12s., less tax 8s. 10d. . . .	7	3	2
	228	5	2
SUM OF CHARGE	£7,768	1	1

ARGYLL NAVAL FUND for Year 1910-1911.**DISCHARGE.****I. ALLOWANCES to the five following Recipients—**

Francis Gordon Hunter (sixth year)	.	.	.	.	£40	0	0
Patrick Bruce Lauder (fifth year)	.	.	.	.	40	0	0
Thomas F. Fenton-Livingstone (fourth year)	.	.	.	.	40	0	0
M. C. Despard (second year)	.	.	.	.	40	0	0
H. R. Gordon Cumming (first year)	.	.	.	.	40	0	0
					£200	0	0

II. FUNDS as at 30th November 1911—

Amount on Heritable Bond, at 3½ per cent	.	£3,500	0	0			
£3,193, 6s. 8d. North British Railway Company							
3 per cent Debenture Stock, purchased at	.	2,650	0	0			
£550 Lancashire and Yorkshire Railway Com-							
pany 3 per cent Debenture Stock, purchased							
at	.	611	10	6			
£190 London and North-Western Railway Com-							
pany 4 per cent Guaranteed Stock, purchased							
at	.	259	1	11			
					£7,020	12	5
Balance in Royal Bank on Account Current	.	547	8	8			
					7,568	1	1

SUM OF DISCHARGE . . . £7,768 1 1

ARCHD. BUCHAN HEPBURN, *Chairman of Directors.*
ALEXANDER CROSS, *Director.*
WM. HOME COOK, C.A., *Auditor.*

VIEW OF RECEIPTS AND PAYMENTS

For the Year 1910-1911.

RECEIPTS.

1. ANNUAL SUBSCRIPTIONS AND ARREARS received	£1,274	9	6		
2. LIFE SUBSCRIPTIONS	619	16	0		
	£1,894	5	6		
3. INTERESTS AND DIVIDENDS—					
Interests	£2,519	0	7		
Dividends	1,311	2	7		
		3,830	3	2	
4. TRANSACTIONS		40	19	7	
5. RECEIPT on account of Dumfries Show			0	5	0
6. RECEIPTS from Inverness Show		6,229	8	2	
7. INVESTMENTS realised	£5800	0	0		
8. INCOME-TAX repaid for year to 5th April 1911		237	10	6	
9. MISCELLANEOUS		2	18	8	
SUM OF RECEIPTS	£12,235	10	7		

PAYMENTS.

1. ESTABLISHMENT EXPENSES—			
Salaries and Wages	£1,637	0	0
Fen - duty, Taxes, Coal, Gas, Insurance, Repairs, and Furnishings	191	15	0
	£1,828	15	0
2. FEE TO AUDITOR of Accounts for year 1909-1910	75	0	0
3. EDUCATION	195	14	10
4. CHEMICAL DEPARTMENT	188	4	4
5. VETERINARY DEPARTMENT	14	0	6
6. BOTANICAL AND ENTOMOLOGICAL DEPARTMENT	53	16	0
7. DAIRY DEPARTMENT	271	13	5
8. EXPENSES in connection with Trials of Potato Diggers	52	16	0
9. EXPENSES in connection with Inspection of Sites for Show of 1912	24	8	0
10. SOCIETY'S TRANSACTIONS	798	11	9
11. ORDINARY Printing, Advertising, and Postages	197	0	1
12. SALARY of Consulting Engineer	25	0	0
13. GRANTS to Public Societies	25	0	0
14. SPECIAL Donations	550	0	0
15. MISCELLANEOUS PAYMENTS	111	2	3
16. INVESTMENTS made	£7,906	16	0
17. EXTRAORDINARY Expenditure	1,460	15	0
18. PAYMENTS on Account of 1910	226	3	0
19. PAYMENTS in connection with Inverness Show—			
Premiums	£2,366	16	1
General Expenses	4,029	5	8
	6,396	1	9
20. PREMIUMS for Local Shows and District Competitions	616	11	8
SUM OF PAYMENTS	13,110	13	7
BALANCE OF PAYMENTS	£875	3	0

ARCHD. BUCHAN HEPBURN, *Chairman of Directors.*
 ALEXANDER CROSS, *Director.*
 WM. HOME COOK, C.A., *Auditor.*

EDINBURGH, 10th January 1912.

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 1st MARCH 1911.

C. H. SCOTT PLUMMER in the Chair.

Inverness Show of 1911.

Intimation was made of a subscription of £25 towards the funds of the Show of 1911 from the Inverness-shire Farmers' Society.

The SECRETARY stated that the name of Mr Malcolm, Dunmore, had been omitted from the list submitted of stewards of the Inverness Show, and he asked that the Directors approve of the appointment of that gentleman as Steward of Forage. The proposal was unanimously agreed to.

Show of 1912.

A letter was read from the Town Clerk of Cupar stating that the Cupar Town Council recommend the Directors to hold the Cupar Show of 1912 in the second week of July.

After some discussion it was unanimously agreed to hold the Show on the 8th July and three following days.

The Show of 1913—Applications from the West.

The SECRETARY intimated that the Show of 1913 fell to be held in the Glasgow District. Applications had, he said, been received from Glasgow, Lanark, and Paisley desiring that the Show should be held in these towns. He understood that it was likely that an application would also be received from the town of Ayr. These applications would require to be considered, so that the matter could be dealt with at the Inverness meeting, and it would be desirable to appoint a committee to make the necessary inquiries and report.

Mr CROSS of Knockdon moved that it be remitted to a Committee, with powers, to visit the places mentioned and obtain such local information as they could get, and report to the Board.

Mr A. H. ANDERSON seconded, and the motion was agreed to. A Committee was then appointed of representatives from districts other than those interested.

This was agreed to.

Development Fund Grants.

The SECRETARY reported that a Special Committee appointed to consider as to what course, if any, the Society should take with the view of getting any share to Scotland of Development Fund money available for encouraging the improvement of live stock had met that day, and authorised him to prepare a statement indicating what the Society had been doing in that direction, and certain lines upon which development might be continued if further funds were available, and to send it to the Commissioners and also to the Scottish Office. It was understood that any sum that might be allocated to Scotland, except that for the horse-breeding scheme, would come through the Scottish Office. The Committee had given him instructions as to how the present work of the Society could be extended in the event of funds being available. If they approved of what had been done, they would also approve of the Committee further considering the matter with the view to bringing up a report.

The proposal of the Committee was adopted.

The SECRETARY stated that, in looking into the matter, he found that the Society had itself distributed a sum of £56,000.

Research Work.

The SECRETARY reported on behalf of the Science Committee with regard to the Conference held in the Society's Chambers the previous day. The Committee resolved to recommend as follows: "That having learned with satisfaction that it is the intention of the Scottish Education Department to appoint a Committee to advise the Department in the conducting of agricultural research in Scotland, this Society is of opinion that it is undesirable to have another Scottish Committee organised on the same subject, and therefore, while thanking the Council of the Royal Society for its interest in the matter, the Society does not see its way to appoint a representative to act on the Committee referred to in the letter from the Royal Society of date the 24th January. In the event of the Department at any time desiring the assistance of representative bodies in Scotland, this Society would heartily co-operate with the Royal Society of Edinburgh and other bodies for the purpose."

The Committee's recommendation was approved of, and it was agreed to submit the following names to the Scottish Education Department as qualified members of the Advisory Committee on Agricultural Research in Scotland: Dr David Wilson of Carbeth, Dr Shirra Gibb, and Dr R. S. Macdougall.

Proposed Change in the Law.

It was reported, on behalf of the Science Committee, that a letter had been received from Mr G. Fortune, Estate Office, Colinsburgh, Fife, suggesting that the Board of Agriculture should be urged to seek such amendment of the Fertilisers and Feeding Stuffs Act as would lead to more stringent dealing with traders who fraudulently sell spurious manures and feeding-stuffs. He especially urged that the Act should be amended so as to enable County Councils to prosecute fraudulent vendors without requiring the consent of the Board of Agriculture.

The Committee recommended that a representation be sent to the Board of Agriculture urging that the Fertilisers and Feeding Stuffs Act should be amended so that the sanction of the Board of Agriculture be not required to enable local authorities to prosecute fraudulent vendors of manures and feeding-stuffs.

Mr A. M. GORDON of Newton moved that no action be taken. He said he had the honour to serve on a Departmental Committee on the subject, and if they made inquiry they would find it was a little hard on the expositors of feeding-stuffs and fertilisers that they should be entirely at the mercy of County Councils. It would be a little bit rash to give the County Councils so much power, and it was not at all necessary, because if they could prove a decent case they would get the consent of the Board of Agriculture.

Mr E. DOUGLAS PATON seconded.

Dr WILSON of Carbeth, as Convener of the Committee, moved the adoption of the recommendation. He said in England recently the Board of Agriculture had not seen their way to give permission to local bodies to prosecute, and had only given their consent under pressure, and the same thing was beginning to occur in Scotland. He did not see why that Act should be in a different position from the Food and Drugs Act.

Sir ARCHIBALD BUCHAN HEPBURN, Bart., seconded, remarking that he thought they might take it that the action of the County Councils would be sound and sane. He did not think that County Councils would throw themselves into any kind of prosecution unless it was brought home to them that it was in the interests of the public.

Mr JAMES HENDRICK, the Society's Chemist, on the invitation of the Convener of the Science Committee, made some remarks on the subject. He said he saw no reason why, in the case of the Fertilisers and Feeding Stuffs Act, the sanction of a Government Board had to be got before a prosecution could be instituted, while in the case of the Food and Drugs Act it had not to be obtained. If hardship was liable to arise through the action of local authorities, it was just as likely to arise under the one Act as under the other. When the Fertilisers and Feeding Stuffs Act was passed he was inclined to think it was an advantage to have the safeguard to manufacturers of getting the Board of Agriculture's sanction to a prosecution, but since then he was inclined to alter his opinion. The Board of Agriculture had found it necessary to place obstacles in the way of local authorities taking action. A Government Board had to look at a case of this kind from a different point of view from that of the Local Authority. They had a very wide and broad responsibility, and they had to consider what effect it would have upon their prestige and position if they gave sanction to a

prosecution that afterwards failed. He next referred to what he called a serious case in Aberdeen, and said that the Board of Agriculture had their position somewhat compromised by the fact that in a previous case in England, where the circumstances were pretty much the same, the Board refused their permission to prosecute. Lord Carrington, in the House of Lords, defended the action of the Board. Although the authorities in Aberdeenshire had difficulties in getting liberty to prosecute, eventually they got permission, and a conviction was obtained.

The Science Committee's recommendation was carried by a large majority.

MEETING OF DIRECTORS, 5TH APRIL 1911.

C. H. SCOTT PLUMMER in the Chair.

Inverness Show.

A donation of £5 to the local fund for the Inverness Show was intimated from Sir George Bullough of Rum.

A letter was submitted from the Secretary of the Highland Club, Inverness, intimating that the Office-bearers and Directors of the Society had been elected Honorary Members of the Club when in Inverness attending the Show.

Cupar Show of 1912.

A letter was read from the Town Clerk of Cupar confirming the detailed arrangements for holding the Show of 1912.

Improvement of Live Stock, and Grants from Development Fund.

The SECRETARY stated that, in accordance with instructions, he had sent to the Development Commission, the Board of Agriculture, the Secretary for Scotland, and the Scottish Education Department the Statement which, under the direction of the Special Committee on the subject, he had prepared on the work of the Society in promoting improvement in Farm Live Stock, and indicating lines upon which grants from the Development Fund might be employed with advantage for similar purposes. Acknowledgment of the receipt of the Statement had been received.

Veterinary Inspection of Clydesdales.

The Special Committee reported that they had finally adjusted their decision. Their recommendation was that the grants given by the Highland and Agricultural Society for premium stallions should hereafter only be awarded to horses which had passed the inspection of the Board of Agriculture and Fisheries under the horse-breeding scheme.

The report was unanimously agreed to.

Science Committee.

The SECRETARY intimated that a grant of £50 had been received from the Board of Agriculture in aid of the expenses of the Mutton and Manure Experiments. It was agreed that the plant, fencing, &c., which had been used in the course of the experiments now completed, should be given to the farmers who had carried them out. These gentlemen had incurred considerable trouble, and gave great attention to the work.

Report by Chemist on Deficient Samples.

The Society's Chemist submitted his report on deficient samples of Manures and Feeding-Stuffs analysed by him for Members since the Meeting of the Board in February.

Fertilisers and Feeding Stuffs Act.

A communication was read from the Board of Agriculture and Fisheries with reference to the resolution passed at the last Meeting in favour of the Board taking steps to amend this Act so as to annul its own veto on prosecutions. The Board referred in detail to the Fish Manure Case that had incidentally been mentioned at last Meeting, and gave the dates of the various stages. These showed that the Board had not employed its veto in this case.

The Secretary read his reply to this communication, in which he pointed out that it was not owing to any special circumstances in any particular case that the Board arrived at its resolution of last Meeting, but on the general ground that the power exercised by the Board of Agriculture officials over local authorities was not required. The contention of the Board was that prosecutions under the Fertilisers and Feeding Stuffs Act should be put upon the same footing as prosecutions under the Food and Drugs Act.

Mr Gordon Duff of Drummur asked for information as to the proportion of cases in which the Board had refused permission to prosecute. It was not necessary for the Board's purpose to cite the Fish Manure Case, in which a conviction had been secured.

Mr James Hendrick, the Society's Chemist, said that with reference to that particular case there was no difficulty when the consent of the Board was given to the prosecution in securing a conviction. The particulars which Mr Gordon Duff asked for were to be found in the Report by the Board of its proceedings for last year. The number of instances in which prosecutions were allowed by the Board was very few indeed compared with the total number of cases brought under their notice. Further, the Board had taken up an unfortunate position with respect to condiments and foods of a like nature sold under fancy names. The attitude of the Board was that these were not foods, and that the Act did not apply. He was unable to understand this reasoning, seeing that locust beans formed a considerable proportion of the constituents of such compounds.

Royal Society of Edinburgh.

A letter was read from the Secretary of the Royal Society of Edinburgh indicating that, owing to the action taken by the Scottish Education Department, it was not the intention of the Society to proceed any further with the organisation of research work in Scotland.

Forestry Examination.

Professor R. Stanfield, the Society's Engineer, was appointed to succeed Mr Belfrage as an Examiner in Land Measuring, &c.

Stewart v. Williamson.

Following the precedent in the Ardery Case, it was unanimously agreed to give a donation of £50 towards the expenses of the appeal in the case of Stewart v. Williamson.

Marking of Foreign Meat.

A communication was read from the South of Ireland Cattle Trade Association, asking the support of the Society in favour of legislation to provide that all meat sold should be labelled with the name of the country of its origin.

Mr C. M. DOUGLAS moved that no action be taken. Mr J. M. MARTIN seconded.

Mr A. H. ANDERSON moved that they adhere to the resolution passed at the last Aberdeen Show in favour of some such action as was contemplated by the Irish Association. Mr ALEX. CROSS seconded. On a show of hands, fourteen voted for Mr Anderson's motion and two for Mr Douglas's motion.

Election of Directors.

A Special Committee was appointed to consider the whole question of the election of Ordinary Directors. The Chairman was appointed Convener.

MEETING OF DIRECTORS, 3RD MAY 1911.

C. H. SCOTT PLUMMER in the Chair.

Inverness Show, 1911.

The Secretary was instructed to acknowledge, with thanks, a contribution of £20 to this Show from the Black Isle Farmers' Society.

Show of 1913.

A letter was read from the Town Clerk of Ayr inviting the Society to hold the Highland Show of 1913 at Ayr, and offering a free supply of water and a donation of £250 to the funds of the Show.

The Secretary was instructed to convey the thanks of the Society to the Ayr Town Council, and the letter was remitted to the Special Committee appointed to report on the centre for the Show of 1913.

Poultry Conference in Ireland.

It was resolved not to appoint a delegate to attend the Poultry Conference taking place in Dublin this week, it being remitted to the Publications Committee to arrange, if thought advisable, for a report of the Conference for publication in next volume of the Society's 'Transactions.'

Actinomycosis.

The Minutes of the Science Committee also contained a reference to the disease of actinomycosis, or "wood tongue," among cattle, the Inspector of the Board of Agriculture, it was stated, being desirous to obtain information as to the extent of the disease in Scotland, and the districts in which it was most prevalent. It was stated that there had been a number of cases in Fife, and that Mr David Ferrie, Parbroath, had directed the Inspector's attention to these. The Inspector was also referred to Mr A. T. Gordon, yr. of Newton; Dr Shirra Gibb, Boon; Mr Stenhouse, Turnhouse; and Mr Malcolm, Dunmore, for information.

Report by Chemist on Deficient Samples.

Mr HENDRICK, the Society's Chemist, submitted his Report on deficient samples of manures and feeding-stuffs analysed by him for members since the Meeting of the Board in April.

It was reported that the Science Committee had authorised Mr Hendrick to make inquiries as to the case of potato manure referred to in his Report, with the view of ascertaining whether there was evidence of fair sampling, and if so, after consultation with Dr Wilson, to make the name of the seller known confidentially to members of the Society.

This was agreed to.

On the motion of Dr WILSON, seconded by Mr CROSS, it was also agreed to make known confidentially to members the name of the seller of a turnip manure referred to in the Report, provided the chemist obtains evidence of the sample having been properly taken.

MEETING OF DIRECTORS, 7TH JUNE 1911.

C. H. SCOTT PLUMMER in the Chair.

Inverness Show, 1911.

Local Fund.—A letter was read from the Clerk of the Thurso Division of the County of Caithness, intimating a voluntary assessment of £32, 10s. 7d. towards the Local Fund.

A letter was read from the Secretary of the Nairnshire Farming Society intimating a contribution of £20 by that Society.

A letter was read from Mr M'Lean, Factor to the Duke of Sutherland, intimating a donation of £25 by His Grace.

The Secretary was instructed to convey the cordial thanks of the Board to the Caithness County Council, to the Nairnshire Farming Society, and to the Duke of Sutherland.

Prizes for Highland Ponies.—The Secretary submitted a letter from the Board of Agriculture and Fisheries, intimating a grant of £40 to supplement the Prizes offered at the Inverness Highland Show for Highland Pony Stallions. It was resolved that this grant be accepted, and the Meeting approved its allocation so that the Prizes in each of the two classes of Highland Pony Stallions will be £10, £8, £6, £5, £4, and £2.

Admission of Children.—It was agreed that children under twelve years of age be admitted to the Show on Thursday and Friday for sixpence each.

Show of 1913.

The SECRETARY stated that communications had been received from the counties of Ayr, Renfrew, Argyll, and Bute with regard to the proposed voluntary assessment

for the Show. Bute had agreed to levy the assessment, but the other counties preferred to wait until the site of the Show had been decided upon before giving an undertaking on the point.

Veterinary Surgeons Act (1881) Amendment Bill.

In submitting the Report of the Science Committee on this measure, the Secretary read the following resolutions which had been adopted: (1) That the Society learns with satisfaction that the sections of the bill providing for the extension of the disciplinary powers of the College have been withdrawn; (2) that the Society would desire to refrain from taking action with regard to the domestic policy of the College or the profession, provided the interests of stockowners were reasonably safeguarded, and therefore would be prepared to withdraw its opposition to the bill if sub-section 5, section 3, be amended so as to provide that such bye-laws as may be made or altered under the provisions of this sub-section must have the approval not only of the Privy Council but also of the Board of Agriculture and Fisheries."

Dr WILSON of Carbeth, in moving the approval of these resolutions, remarked that the Committee thought the Board of Agriculture should have a say in the alteration of bye-laws, and the Committee therefore proposed that the Board as well as the Privy Council should approve of any changes which took place from time to time.

Mr WM. DUTHIE, Collynie, seconded, and the resolutions were agreed to.

The Secretary was authorised to send a copy of the resolutions to the Board of Agriculture and Fisheries, and to the Royal College of Veterinary Surgeons.

National Diploma in Agriculture.

The SECRETARY submitted the Report on the examinations held last week at Leeds for the National Diploma in Agriculture.

Mr CROSS, in moving the adoption of the Report, expressed regret that none of the Scotch students this year had got into the honours list. This was not in accordance with precedent, as Scotch students in former years had done best.

Forestry Examination.

The SECRETARY reported that six candidates had sat for the Society's Certificates in Forestry. Two had obtained first class certificates and one a second class certificate. The examiners had reported very favourably on the enhanced standard attained by the candidates as compared with those in former years.

Election of Directors.

The CHAIRMAN moved the adoption of the Report of the Committee which had been considering this question. The terms of the Committee's recommendations are as follows: (1) That a member who has been twice nominated and has served two full consecutive terms of four years each as an ordinary director shall not be eligible to be again nominated or elected as an ordinary director till after the lapse of at least two years. (2) That the Board of Directors, in nominating extraordinary directors other than the Show Directors for year, shall have power to nominate members resident in important divisions of Show districts that have for four or more years been without direct representation on the Board of Directors by an ordinary director, it being provided that these particular members shall be eligible for nomination and election as extraordinary directors whether or not they have had previous experience of the business of the Society, but that not more than four such extraordinary directors shall hold office at one time.

The CHAIRMAN explained the reasons which had given rise to the appointment of the Committee which now reported. He regarded the objections which had been taken to the present system as perfectly legitimate. It was quite impossible, of course, to provide against every contingency, and to have an absolutely perfect representation, but the Committee were of opinion that were these amendments adopted by the Directors, and confirmed by the General Meeting, they would go far to meet the objections that had been raised, and provide for a more equitable representation of all counties and districts than had been the case hitherto.

Mr A. M. GORDON of Newton seconded. He did not suppose that they would succeed in pleasing every one, but he thought that if the General Meeting would approve of the proposals put forward, a great improvement would be made.

This motion was unanimously agreed to.

Registration of Stallions.

A letter was submitted from the Secretary of the Board of Agriculture and Fisheries stating that in the Regulations for the Veterinary Examination of Stallions for

the Stallion Register to be issued by the Board, it is proposed that the ages of stallions would be reckoned as from the 1st of January of the year of their birth. He added that the Board learned with satisfaction that the Society had resolved to restrict its stallion grants to stallions entered in the Register of the Board.

The Election of Directors.

The SECRETARY submitted the proposed regulations for the nomination and election of Directors as follows: "(1) That a member who has been twice nominated, and has served two full consecutive terms of four years each as an ordinary director, shall not be eligible to be again nominated or elected as an ordinary director till after the lapse of at least two years. (2) That the Board of Directors, in nominating the extraordinary directors other than the Show Directors of the year, shall have power to nominate members resident in important divisions of the Show districts that have for four or more years been without direct representation on the Board of Directors by an ordinary director, it being provided that these particular members shall be eligible for nomination and election as extraordinary directors whether or not they have had previous experience of the business of the Society, but that not more than four such extraordinary directors shall hold office at one time."

The CHAIRMAN said it was resolved by the Committee to recommend the adoption of these resolutions, with two slight amendments. It was considered that if a member had to be two years out of office before being again nominated, as recommended in the last line of the first resolution, it meant that it would be about four years before he could return to the Board. The Committee, therefore, recommended that instead of delaying the nomination of a member for re-election for two years, it should be one year, which meant, on account of the date of the nomination, that it would be at least two years before he could return to the Board. In the second resolution it was proposed that it should be altered to read "members resident in or connected with important divisions of the Show districts." This change was meant to be for the advantage of counties like Caithness and Sutherland, which were so distant from Edinburgh that it was difficult for gentlemen to attend. Under the altered rule these counties might find gentlemen resident in Edinburgh who would look after their interests. With these two changes the Committee recommended that the resolutions should be adopted.

A discussion followed, in the course of which it was pointed out that as the nominations took place in February the director had not served his two consecutive terms, and that he might be nominated for another. Eventually it was agreed, on the suggestion of Dr Wilson of Carbeth, to make the resolution read: "That a member who has been twice nominated and has served, or is in process of serving, two full consecutive terms," &c. The resolutions were then adopted.

MEETING OF DEPUTATION OF DIRECTORS HELD IN SHOWYARD, INVERNESS, 26TH JULY 1911.

C. H. SCOTT PLUMMER in the Chair.

Inverness Show, 1911.

A donation of £25 by Mr Andrew Carnegie of Skibo towards the Show Fund was intimated.

Regulations for Nomination and Election of Directors.

The following resolutions were unanimously approved:—

That the Bye-Laws and Regulations of the Society relating to the nomination, election, and retirement of Directors of the Society be altered so as to provide as follows, viz. :—

(1) That a member who has been twice nominated and has served or is in process of serving two full consecutive terms of four years each as an Ordinary Director shall not be eligible to be again nominated or elected as an Ordinary Director till after the lapse of at least one year.

(2) That the Board of Directors, in nominating the Extraordinary Directors other than the Show Directors of the year, shall have power to nominate members resident in or connected with important divisions of the Show districts that

have for four or more years been without direct representation on the Board of Directors by an Ordinary Director, it being provided that these particular members shall be eligible for nomination and election as Extraordinary Directors whether or not they have had previous experience of the business of the Society, but that not more than four such Extraordinary Directors shall hold office at one time.

Government Grant for Highland Ponies.

The SECRETARY stated that, owing to insufficient entries, a portion of the prize-money offered for Highland Pony Stallions could not be awarded. The total sum offered was £70—made up of £22, 10s. from the Society's own funds, £7, 10s. given by the Polo and Riding Pony Society, and £40 by the Board of Agriculture. The sum awarded was £48—that is, £25, 10s. more than the amount offered by the Society. Mr Anstruther, of the Board of Agriculture, who was present in the Show-yard, agreed that the whole of this £25, 10s. be taken from the grant from the Board of Agriculture, and with regard to the balance of £14, 10s. of the grant from the Board of Agriculture, he (the Secretary) had received the following letter from Mr Anstruther:—

SHOWYARD, INVERNESS,
25th July 1911.

DEAR MR MACDONALD,

I understand that the Directors of the Highland and Agricultural Society propose, in view of the situation which has arisen owing to the shortage of entries in the Highland Pony Stallion classes, that the balance of £14, 10s. still available from the £40 offered by the Board as additional prizes at the Inverness Show shall now be awarded as two prizes for the "Extra Stock" shown in these classes, and I am glad, on behalf of the Board, to agree to this allocation of the money remaining, if the Directors so decide.

The Board are anxious that the money available shall be used in its entirety for the encouragement of the breed, and, as you know, they originally contemplated that the "Extra Stock" should be available to compete, though this arrangement had for several reasons to be set aside.

Yours truly,

(Signed) A. W. ANSTRUTHER,
Assistant Secretary.

The Board resolved that the balance of £14, 10s. be awarded for the two Highland Pony Stallions, Nos. 496 and 490 in the Catalogue, belonging to his Majesty the King and William Logan, V.S., Inverness, exhibited as Extra Stock.

The Secretary was instructed to convey the best thanks of the Board to Mr Anstruther.

Veterinary Surgeons Act (1881) Amendment Bill.

The Secretary submitted the following letter from the Solicitor to the Royal College of Veterinary Surgeons:—

32 ESSEX STREET, STRAND, LONDON, W.C.,
24th July 1911.

DEAR MR MACDONALD,

Your letter of the 8th ultimo, with a copy of the Resolution of your Society of the 7th ultimo, was brought before the Council of the Royal College of Veterinary Surgeons and most carefully considered. The Council expressed great gratification at the kindly tone of both, and the evident desire of your Society to meet them. With regard to the suggestion that the bye-laws referred to should be approved by the Board of Agriculture as well as the Privy Council, the Council would be very glad indeed if your Society would withdraw or modify it. I am desired to point out that the Board of Agriculture is what might be termed an English Board, and the practitioners in Scotland and Ireland might prefer that the Boards in their respective countries should also be consulted. This would not only mean a great deal of delay, but if so many bodies had to be consulted, might sometimes result in differences of opinion.

I think the object your Society aims at would be accomplished without the amendment, as I know from personal experience that all matters pertaining to the profession referred to the Privy Council are referred by that body to the Board of Agriculture.

ture for advice and opinion, especially if they in any way relate to Agriculture or Stock-breeding. Perhaps it would be more satisfactory if you wrote to the Privy Council and Board of Agriculture and obtained their views on the subject.

I remain,

Yours very faithfully,

(Signed) GEO. THATCHER.

The Directors resolved unanimously to adhere to their former resolution.

MEETING OF DIRECTORS, 1st NOVEMBER 1911.

C. H. SCOTT PLUMMER, and afterwards Sir ARCHIBALD BUCHAN HEPBURN, Bart., in the Chair.

Chairman of the Board for 1911-1912.

On the motion of Mr SCOTT PLUMMER, seconded by Mr GORDON, Sir Archd. Buchan Hepburn of Smeaton, Bart., was unanimously elected Chairman of the Board for the ensuing year.

Sir Archd. Buchan Hepburn thanked the Board for the honour conferred on him.

On the motion of Mr GORDON, a cordial vote of thanks was passed to Mr Scott Plummer for his services to the Society as Chairman of the Board of Directors for the past two years.

Mr Scott Plummer acknowledged, and paid a tribute to the staff for assistance rendered him.

The Secretary.

The Chairman made feeling reference to the serious illness of Mr Macdonald, the Secretary.

The Chief Clerk, Mr John Macdiarmid, was authorised to perform all duties pertaining to the office of Secretary, owing to Mr Macdonald's absence through indisposition.

Second Clerk.

Reference was also made to the absence, owing to illness, of Mr Cowie, the Second Clerk, who had undergone a serious operation.

Standing Committees.

The Standing Committees for the ensuing year were appointed, the names to be printed as usual in the Premium Book.

Representatives on other Bodies.

The following were appointed representatives of the Society on the Boards of Management of the undernoted institutions for the ensuing year—viz.: *West of Scotland Agricultural College*—Very Rev. John Gillespie, LL.D., Mouswald Manse, Ruthwell, R.S.O.; John M. Martin, Craufurd, Lasswade. *Edinburgh and East of Scotland College of Agriculture*—R. Shirra Gibb, Boon, Lauder; James Macdonald, Secretary. *Aberdeen and North of Scotland College of Agriculture*—Thomas Gordon Duff of Drummur, Keith; William Duthie, Tarves. *Royal (Dick) Veterinary College*—John M. Martin, Craufurd, Lasswade.

Inverness Show.

An abstract of the Accounts of the Inverness Show was submitted, showing a probable deficit of about £280.

The list of awards was laid on the table.

Transference of Tickets.

Dr SHIRRA GIBB moved that a Committee be appointed to consider the whole question of admission by tickets at the gates, and to report.

Mr FERRIE seconded.

The motion was agreed to, and a Committee appointed as follows—viz.: Mr M'Hutchen Dobbie (Convener), Mr Cross, Mr Ferrie, Dr Shirra Gibb, Mr Paton, and Captain Gordon.

Potato Digger Trials.

Mr PATON, the Chairman of the Committee on Implements, stated that the Report by the Judges on the Trial of Potato Diggers was being revised, and would be printed and issued as soon as possible.

On the motion of the CHAIRMAN, a special vote of thanks was awarded to Mr Stenhouse for the admirable arrangements made by him for carrying out the trials.

Vice-President.

On the motion of Mr W. S. FERGUSON, Mr W. Steuart Fotheringham of Murthly was unanimously elected Vice-President in room of the late Colonel Home Drummond.

Cupar Show, 1912.

Date of Show.—The Royal Agricultural Society of England having fixed the date of their Show at Doncaster on the week immediately preceding that arranged for the Highland Show at Cupar—viz., 9th to 12th July,—a discussion took place as to whether it would be advisable or not to alter the date of the Cupar Show, so as to give exhibitors more time to bring their exhibits from Doncaster to Cupar.

It was remitted to the Chairman of the Board and the Vice-Convener of the Local Committee to confer with the Manager of the North British Railway regarding the matter, and to report to the next Meeting of the Board.

Forestry Exhibition.—An application for space in the Showyard for a Forestry Exhibition, and a grant of £20 towards prizes for exhibits, was submitted from the Royal Scottish Arboricultural Society.

Mr ANDERSON stated that there were many complaints from exhibitors in the Forestry Exhibition at Inverness about their exhibits not having been returned. He also stated that Mr Galloway, the Secretary to the Royal Scottish Arboricultural Society, and Mr Fraser, the local Secretary, had been written to regarding this matter, but no satisfactory reply had been received.

On the motion of Mr Cross, seconded by Mr DOUGLAS, it was agreed that the usual space in the Showyard be given, but that the grant of £20 be not made until the exhibitors at Inverness were satisfied as to the return of their exhibits.

Horse-Shoeing Competition.—A letter was read from Mr Andrew Smith, Convener of the Fife Agricultural Societies' Horse-Shoeing Competition, asking the Society to hold a Horse-Shoeing Competition at the Cupar Show. Mr CHRISTIE stated that the local Society would provide the horses, also the forges, bellows, and other material, and that very little outlay would be incurred by the Society.

The Board thereupon agreed to give prizes for horse-shoeing at Cupar Show.

Artificial Colouring of Blackface Sheep.

A petition, signed by ninety-five breeders of Blackface sheep from all parts of Scotland, asking the Directors to pass a rule prohibiting the artificial colouring and otherwise tampering with the fleeces of Blackface sheep exhibited at the Society's Show and at local shows subsidised by the Society, was submitted. A letter was also read from the Hon. Secretary of the Blackface Sheep-Breeders' Association stating that at the Annual General Meeting of that Association a motion was carried by a large majority in favour of requesting the Directors of the Highland Society to take action to prohibit the artificial colouring of Blackface sheep at the Society's Annual Show.

After considerable discussion, it was remitted to the following Committee with power to deal with the whole question of colouring sheep, to call in outside advice, and to report to next Meeting of the Board—viz., Dr Shirra Gibb (Convener), Mr Ferguson, Mr Howatson, Mr Buttar, Mr Ferrie, Mr M'Laren, and Mr Whyte

Science Committee.

The Board resolved (1) that experiments to determine the degree of impurity in the air of byres should be carried out by the Society's Chemist during the coming winter at a cost not exceeding £25; (2) that the assistance of the Society's Chemist be given to Mr Dewar, Fasque, Fettercairn, in an experiment which he is carrying out on the value of pasture obtained from different seed mixtures.

Report by Chemist on Deficient Samples.

The Society's Chemist submitted his Report on Deficient Samples of Manures and Feeding-Stuffs analysed by him for Members since the Meeting of the Board in June. It was resolved that the Report be published in the newspapers.

Regulations for Nomination and Election of Directors.

The following Resolution, adopted by the General Meeting of Members at Inverness on 26th July 1911, was submitted:—

That the Bye-Laws and Regulations of the Society relating to the nomination, election, and retirement of Directors of the Society be altered so as to provide as follows, viz. :—

(1) That any Member who has served as Ordinary Director for a term of four years shall be ineligible to be again nominated till after the lapse of at least one year.

(2) That the Board of Directors, in nominating the Extraordinary Directors other than the Show Directors of the year, shall have power to nominate Members resident in or connected with important divisions of the Show Districts that have for four or more years been without direct representation on the Board of Directors by an Ordinary Director, it being provided that these particular Members shall be eligible for nomination and election as Extraordinary Directors whether or not they have had previous experience of the business of the Society.

After some discussion, it was agreed to take the opinion of Messrs Tods, Murray, & Jamieson, W.S., the Society's Law Agents, as to whether, according to the Charter, a General Meeting of the Society has the power to amend or modify the Resolution.

Sale of Foreign Chilled Meat.

It was agreed to support the Elgin County Council in a petition to the Board of Agriculture to appoint inspectors or detectives who should overlook the sale of meat in the public markets, especially in London, with a view to enforcing the honouring of contracts in which it is specified that home meat alone is to be furnished.

Tuberculosis (Animals) Committee.

It was agreed to petition the Board of Agriculture to put into operation the Tuberculosis Order of 27th May 1909.

Show of 1913.

Mr SCOTT PLUMMER, Convener of the Special Committee appointed to visit the various places which had sent an invitation for holding the Show of 1913, reported that they had visited and examined sites at Lanark, Ayr, Paisley, and Glasgow, and had received handsome offers with respect to the Show. The race-course at Lanark had much to recommend it. In many respects it was an ideal site. At Ayr they had a choice of three sites, any one of them well fitted for the purpose. At Paisley the race-course was one of the finest sites they had ever seen, and at Glasgow they had the offer of a site on Glasgow Green from the Corporation and of the Scotstoun grounds from the Glasgow Agricultural Society. The Committee had great difficulty in making up their minds. It was by no means easy to distinguish between the various sites—as a matter of fact, it was a close thing between all of them. There were many advantages and disadvantages in each case. Taking all circumstances into consideration, the Committee recommended that the site at Paisley be chosen. It was a splendid show-ground from every point of view. It was close to two stations, one of them being almost on the ground. It also had tramway connection with Glasgow and throughout Renfrewshire, and its proximity to Glasgow as the headquarters of the Directors made it very desirable. He moved that Paisley be the site of the 1913 Show.

Mr W. T. MALCOLM seconded.

The motion was unanimously agreed to.

MEETING OF DIRECTORS, 6TH DECEMBER 1911.

Sir ARCHD. BUCHAN HEPBURN, Bart., in the Chair.

Cupar Show.

Date of Show.—The Chairman stated that, as agreed at last Board Meeting, a Conference had taken place between the Society's representatives and the General Manager and the General Superintendent of the North British Railway Company, as

to whether it would be possible for the Railway Companies to bring stock forward in time from the Royal Show at Doncaster, which closes on Saturday, 6th July, to the Highland Show at Cupar, which, according to present arrangement, opens on Tuesday, 9th July. The North British Railway Manager informed the Deputation that he would communicate with the Great Northern and North-Eastern Railway Companies and intimate the result to the Society. A letter was submitted from Mr Black, Superintendent, North British Railway, dated 24th November, stating that, provided there be sufficient stock to warrant the conveyance being made by special train, and that it be handed to the Railway Company at Doncaster on the afternoon of Saturday, 6th July, it would be due to reach Cupar some time during the day on Sunday, 7th July.

The Board resolved to adhere to the date fixed for the Cupar Show—viz., 9th to 12th July.

Regulations for Appointment of Judges.—Mr MARTIN moved—

That for Regulation (a) of Regulations for the Appointment of Judges, the following be substituted:—

(a) In the invitation to Judges to act, a condition shall be inserted providing that, in the event of the Judge accepting the appointment to act as a Judge at the Highland Show, he shall not, prior to that Show in the same year, act as Judge of the same class of stock at any other Scotch open Show, or Scotch Show open to one or more counties, or at the Show of any of the following Agricultural Societies—viz., the Bath and West and Southern Counties, the Royal Society of England, the Royal Lancashire, the Yorkshire, or the Royal Dublin Society.

Mr GORDON seconded, on condition that the motion only excluded those who judged at the Shows of the Royal Society of England and the Royal Dublin Society.

Mr Martin accepted Mr Gordon's amendment, and the motion was agreed to as follows:—

(a) In the invitation to Judges to act, a condition shall be inserted providing that, in the event of the Judge accepting the appointment to act as a Judge at the Highland Show, he shall not, prior to that Show in the same year, act as Judge of the same class of stock at any other Scotch open Show, or Scotch Show open to one or more counties, or at the Show of the Royal Society of England, or the Show of the Royal Dublin Society.

Prize List.—The Report of the Shows Committee of 31st October and the Minutes of the Shows Committee, 6th December, were submitted.

The Committee recommended (1) that two classes for Shetland Cattle be included in the Prize List, the same as for Jerseys, and that the prize money be the same for both breeds—viz., £5, £3, and £2 in each class. (2) That the classes and prizes for Hunters be the same as at Dumfries Show, 1910. (3) That the Highland Pony classes for young stock be as follows: Highland Pony Fillies, foaled after 1st January 1910; Highland Pony Entire Colts, foaled after 1st January 1911; and that the prize money in all the six Highland Pony classes be the same—viz., £5, £3, and £2. (4) That an additional class for Driving be added for Ponies under 14 hands—prizes, £3 and £2. (5) That £2 be added by the Society to the sum offered by the Shropshire Sheep-Breeders' Association for prizes for a class for Shropshire Aged Tups, making the prizes the same as that for the Shropshire Shearling Tups. (6) That improvements and alterations on the ladies' room be carried out at a cost not exceeding £22.

Cupar and District Horticultural Society.—It was agreed to give space in the showyard, for their exhibition, to the Cupar and District Horticultural Society.

The Royal Scottish Arboricultural Society.—A letter was read from the Secretary of the Royal Scottish Arboricultural Society explaining as to the exhibits which had gone amissing at the Inverness Show, and saying that he had been instructed by his Council to offer to pay the value of the missing exhibits to the owners.

The Board accepted the explanation, and agreed to give the usual grant of £20 for prizes for timber to the Royal Scottish Arboricultural Society for Cupar Show, on the same conditions as at Inverness Show.

Trial of Potato Diggers.

The Report by the Judges was submitted and approved.

The Shoeing of Hackneys and Harness Horses.

Captain GORDON moved: "That in future at the Shows of the Society, exhibitors of Hackneys and Harness Horses be required to adhere to the Rules and

Regulations of the Hackney Horse Society with regard to the weight of shoes on their exhibits."

Mr ANDERSON seconded.

The motion was unanimously agreed to.

The Rules of the Hackney Horse Society are as follows:—

For Hackneys exceeding 14 hands (except Hackney yearling colts and Hackney yearling fillies), no shoe (nails included) may exceed 2 lb. in weight.

For Ponies not exceeding 14 hands, Hackney yearling colts and Hackney yearling fillies, no shoe (nails included) may exceed 1½ lb. in weight.

It was resolved that the Society's Veterinary Inspector be instructed to examine all the Hackneys and Harness Horses on the opening morning of the Show, and see that the Rules of the Hackney Horse Society as to the weight of shoes are complied with.

Regulations for Nomination and Election of Directors.

The following Resolution, adopted by the General Meeting of Members at Inverness on 26th July 1911, was submitted:—

That the Bye-Laws and Regulations of the Society relating to the nomination, election, and retirement of Directors of the Society be altered so as to provide as follows, viz.:—

(1) That any Member who has served as Ordinary Director for a term of four years shall be ineligible to be again nominated till after the lapse of at least one year.

(2) That the Board of Directors, in nominating the Extraordinary Directors other than the Show Directors of the year, shall have power to nominate Members resident in or connected with important divisions of the Show Districts that have for four or more years been without direct representation on the Board of Directors by an Ordinary Director, it being provided that these particular Members shall be eligible for nomination and election as Extraordinary Directors whether or not they have had previous experience of the business of the Society.

Mr DOUGLAS moved that in Clause (1) after the words "any member who has served," the words "or is in course of serving" be added.

Mr FERRIE seconded.

Mr MARTIN moved that the Resolution as adopted by the General Meeting of Members at Inverness be approved.

Dr SHIRRA GIBB seconded.

On a show of hands, Mr Martin's motion was carried by 15 votes to 8.

Colouring of Sheep.

The following Minutes of Meeting of Committee of 6th December were submitted:—

The Committee recommended (1) that the Committee deal only with the colouring of Blackface Sheep in the meantime; (2) that the Steward of Sheep, who can call in assistance if so desired by him, shall have full power to disqualify any pen of Blackface Sheep which he considers unnaturally coloured, or when the fleece has been dealt with by the use of foreign substances.

The recommendations of the Committee were unanimously approved.

District Shows.

The following Report by the Committee was submitted:—

The Committee recommended (1) that all the applications for grants of money and medals be printed and circulated to the Committee before the date of the meeting at which these applications are to be considered; (2) that the resolution adopted by the Directors last April as to the veterinary examination of stallions receiving the Highland Society's grants, and of their registration with the Board of Agriculture, be not enforced in connection with the grants given to Horse District Associations for season 1911, as these grants had been promised and the stallions had been engaged before the rule was communicated to the secretaries of the local Horse Associations.

The recommendations of the Committee were agreed to.

Advertisement in Show Catalogue.

A letter was read from Mr Robert Bruce, Agricultural Superintendent, Royal Dublin Society, asking if the Highland Society would reserve a full page in the Show Catalogue, annually, for a standing advertisement in connection with the Shows of

the Royal Dublin Society, free of charge, on the understanding that a similar favour would be granted the Highland Society in the Catalogue of the Royal Dublin Society's Annual Spring Show, held in the month of April.

The Board agreed to the proposal, and instructed the Secretary to give effect to it.

Judges—Cupar Show, 1912.

On the motion of Major CARRUTHERS, it was resolved that in future, on the printed List of Judges issued to the Directors, the names of the Judges who have officiated at the last two Shows of the Society be indicated by some mark.

The Judges for the various classes of stock were then appointed.

MEETING OF DIRECTORS, 10TH JANUARY 1912.

Sir ARCHD. BUCHAN HEPBURN, Bart., in the Chair.

The late Mr James Stenhouse.

The CHAIRMAN referred in feeling terms to the death of Mr Stenhouse, Turnhouse, and moved that the Directors record in the Minutes an expression of the deep regret with which they received the intimation of his death, and of their sense of the valuable services rendered by him to the Society.

Inverness Show, 1911.

A letter was submitted from the Easter Ross Farmers' Club sending a contribution of £20 towards the Funds of the Inverness Show.

The Secretary was instructed to convey the cordial thanks of the Board to the Easter Ross Farmers' Club.

Cupar Show, 1912.

Forage.—It was resolved to accept the offer of The Forage Supply Co., Bonnington, Leith, to supply Forage for the Show.

Stewards.—The Stewards of the various departments were reappointed as follows: Cattle—Mr Kerr, Harviestoun, with Mr Anderson, Kippendavie, as Assistant Steward; Horses—Mr Ferguson, Pictstonhill, with Mr Leadbetter, Knowesouth, as Assistant Steward; Sheep, Swine, &c.—Dr Shiira Gibb, Boon; Forage—Mr W. T. Malcolm, Dunmore Home Farm; Parade Stands—Mr Ferrie, Parbroath; Gates—Mr M'Hutchen Dobbie, Campend; Implements—Mr Paton, Braehead; Horse Shoeing—F. W. Christie, Cupar-Fife.

Veterinary Surgeon.—On the motion of Captain GILMOUR, seconded by Mr CHRISTIE, Mr Robert Reid, M.R.C.V.S., Cupar-Fife, was unanimously appointed Veterinary Inspector for the Cupar Show, on the usual conditions.

Contribution by the Royal Caledonian Hunt.—On the motion of Mr SCOTT PLUMMER, it was agreed to allocate the £40 given by the Royal Caledonian Hunt in separate prizes for Hunters, as follows:—

For the best Heavyweight Hunter over 4 years old bred in Scotland	£15
To the Breeder of do.	5
For the best Lightweight Hunter over 4 years old bred in Scotland	15
To the Breeder of do.	5
	£40

The Fife and Kinross Perpetual Challenge Cup.—Mr Ferrie intimated that he had been instructed by a Committee of Subscribers to ask the Directors to accept a Silver Cup, of the value of not less than £100, from the counties of Fife and Kinross, to be called "The Fife and Kinross Perpetual Challenge Cup," and to ensure that that Cup may be perpetual a sum of money will be handed over to the Society to be funded, the interest of which to be applied to purchase a miniature replica of the Cup for the winner, on each occasion, as a memento of his winning the Cup. The Cup to be given this year either for the best Clydesdale Stallion in the one-, two-, and three-year-old classes, or for the best Clydesdale Stallion in the two- and three-year-old classes.

The Chairman, on behalf of the Board, accepted with much gratification the offer of the Cup, and asked Mr Ferrie to convey to the subscribers the most cordial thanks of the Directors.

After some discussion, it was agreed by 13 votes to 9 that the Cup be given this year at the Cupar Show for the best Clydesdale Stallion in the one-, two-, and three-year-old classes, as against a proposal that it be given for the best Stallion in the two- and three-year-old classes.

It was agreed that the allocation of the Cup at the future Shows of the Society should be left to the recommendation of the Shows Committee.

Ayrshire Cattle Classes.—A Petition was read from sixty of the leading breeders and exhibitors of Ayrshire Cattle, asking the Directors to introduce a separate class for three-year-old Ayrshire Heifers in milk, in place of having them classed with the aged Ayrshire Cows in milk.

On the motion of Mr CROSS, the Board agreed to reinstate the class for three-year-old Ayrshire Heifers in milk, with prizes of £10, £7, and £3, as at Dumfries Show in 1910.

It was resolved to delete from the Cupar Show Prize List the class for two-year-old Ayrshire Heifers in calf.

Special Prizes for Milk Yield Class.—An offer by Colonel Fergusson-Buchanan of Auchentorlie of £10, 10s., in prizes of £8, £3, £1, and 10s., for Special Milk Yield Class for Cows of the Ayrshire breed, three years old and upwards, was submitted.

The Board accepted the offer, and accorded Colonel Fergusson-Buchanan a cordial vote of thanks.

It was agreed to accept the services of Mr John M. Howie, Secretary, Ayrshire Cattle Herd-Book Society, as Attendant on the Competition, and arrange for the necessary appliances for weighing and testing the milk; assisted by Mr Lennox, the Supervisor to the Scottish Milk Records Committee.

Mr Cross was nominated as the Society's representative to superintend the Competition.

Veterinary Inspection of Clydesdale Stallions.

Mr FERGUSON moved: "That the Rule adopted by the Directors in April last, providing that the Grant given by this Society will be available only for Stallions which, for the year to which the Grant applies, are registered in the Register of Certified Draught Stallions published by the Board of Agriculture, be rescinded."

Mr MALCOLM seconded.

Mr MARR moved: "That the Rule be not rescinded."

Captain GILMOUR seconded.

On a show of hands, Mr Marr's motion was carried by 18 votes to 5.

Mr CAMERON moved: "That all Clydesdale Stallions, four years old and under, be registered in the Board of Agriculture Register, and that the Society's premiums should only be given to Stallions of the above age."

Mr CROSS seconded.

On a show of hands being taken between Mr Cameron's motion and that of Mr Marr, the latter was carried by 12 votes to 10.

Milk Records.

The following excerpt from the Minute of a Meeting of the Scottish Milk Records Committee, held within the George Hotel, Kilmarnock, on 16th December 1911, was submitted, Mr Charles Douglas of Auchlochan in the chair: "The Sub-Committee appointed at last Meeting submitted the following report appreciative of the work done by the Highland and Agricultural Society in the aiding of milk-recording in Scotland, namely—

"In view of the grant of money offered to this Committee to carry on the work of milk-recording in Scotland through the medium of the Scottish Education Department, this Committee desire to place on record their appreciation of the great aid rendered to the movement by the Highland and Agricultural Society of Scotland. In 1903, acting on the initiative of the late Mr John Speir, and the experience gained in Denmark and other countries, the Highland and Agricultural Society decided to foster the formation of local societies, to take up on a reliable basis the keeping of milk yields of cows; and for a period of four years thereafter the work was financed, controlled, and administered with increasing success by that Society. Towards the end of 1907, the Highland and Agricultural Society, believing that the administration of the work would be better under the control of those more directly interested in the breeding of cows for milk production, approached the Ayrshire Cattle Herd-Book Society and breeders generally with the view of taking up the movement, and the result was that this Committee was formed. The Highland and Agricultural Society continued, however, to take a great interest in the work, and have since

contributed a sum of £200 annually towards the funds. In 1910 this Committee made an application to the Development Commissioners for a grant to carry on the movement, and the Highland and Agricultural Society made a representation strongly recommending the application. In consequence, the work of milk-recording received favourable consideration, and it is largely owing to the influence of the Highland and Agricultural Society that the grant above mentioned was obtained. The breeders and owners of milking cows recognise their indebtedness to the initiative and liberality of the Highland and Agricultural Society in fostering this movement, and so enabling them to improve the milking qualities of the dairy herds of Scotland."

Regulations for Nomination and Election of Directors.

The following Resolution, adopted by the General Meeting of Members at Inverness on 26th July 1911, and approved by the Directors' Meeting on 6th December, was submitted for approval in terms of the Charter:—

That the Bye-Laws and Regulations of the Society relating to the nomination, election, and retirement of Directors of the Society be altered so as to provide as follows, viz.:—

(1) That any Member who has served as Ordinary Director for a term of four years shall be ineligible to be again nominated till after the lapse of at least one year.

(2) That the Board of Directors, in nominating the Extraordinary Directors other than the Show Directors of the year, shall have power to nominate Members resident in or connected with important divisions of the Show Districts that have for four or more years been without direct representation on the Board of Directors by an Ordinary Director, it being provided that these particular Members shall be eligible for Nomination and Election as Extraordinary Directors whether or not they have had previous experience of the business of the Society.

The CHAIRMAN moved the approval of the resolution.

Mr GORDON seconded.

The resolution was unanimously approved.

Show of 1914.

Mr SCOTT PLUMMER moved: "That provided a suitable site is available, and satisfactory financial and other arrangements can be made, the Show of 1914 be held in the Border district."

Mr LEADBETTER seconded.

The resolution was unanimously adopted.

Report by Chemist on Deficient Samples.

The Society's Chemist submitted his Report on deficient samples of Manures and Feeding-Stuffs analysed by him for Members since the Meeting of the Board in November.

Royal (Dick) Veterinary College, Edinburgh, and the Glasgow Veterinary College.

The Report by the Finance Committee as to the application by the Royal (Dick) Veterinary College for a further donation towards the building and equipment of the new College, and an application by the Glasgow Veterinary College for a further grant towards the capital expenses involved in the improvements of the College buildings, recommended that no further grant be given to the Royal (Dick) Veterinary College or to the Glasgow Veterinary College.

The Report was approved.

MEETING OF DIRECTORS, 7TH FEBRUARY 1912.

Sir ARCHD. BUCHAN HEPBURN, Bart., in the Chair.

Resignation of Mr James Macdonald, Secretary to the Society.

The CHAIRMAN said that he had an important communication to submit to them in connection with the Secretaryship of the Society. It was a letter, dated 29th January 1912, received from Dr W. Kelman Macdonald, the son of their Secretary. It was

in the following terms: "I find myself under the necessity, on behalf of my father, Mr Macdonald, the Secretary of the Society, to announce through you his resignation of his office of Secretary. This intimation, it will be understood, is made solely because of the state of my father's health, which prevents his writing or even signing this letter on his own account. It is written, however, with his full concurrence, and after being read to him. My father asks me to say that in what remains to him of time he will ever cherish the recollection of the kindness to himself of the members of the Society, and particularly of the Directors, present and past. Throughout his tenure of office he has regarded it as a pleasure and privilege no less than a duty to serve the Society to the utmost of his power. The resignation will take effect as and from a date to be fixed by the Directors." The Chairman, continuing, said that an event of that kind was one which the Society felt very strongly, because Mr Macdonald had been associated with its prosperity over a long period of years, and that prosperity was largely due to the efforts he made on their behalf. He was sure he was only expressing the regret of every member of the Society that circumstances had arisen which had necessitated the resignation taking place.

Cupar Show, 1912.

Prize List.—Proof of the Prize List was submitted and approved.

Hotel and Catering.—It was resolved that the headquarters of the Directors and Judges be at the Grand Hotel, St Andrews, and that the Caterers in the Showyard be: James Mitchell, Union Buildings, Aberdeen (Committee Booth); John Brodie, Cross Keys Hotel, Dalkeith; Thomas White, Ltd., 7 and 9 Gordon Street, Glasgow; John Smith & Sons, 84 Gordon Street, Glasgow; William Mason, Bruce Arms Hotel, Falkland. Tea Pavilion—The British Women's Temperance Association.

Vacancy in the List of Directors.

Mr J. T. M'Laren, The Leuchold, Dalmeny Park, was unanimously nominated to fill the vacancy in the list of Directors caused by the death of Mr James Stenhouse.

Science.

The Science Committee recommended (1) that the Schedule of Unit Prices of Manure and Feeding-Stuffs for the current year, as now revised, be printed and issued as usual; (2) that the Society's Chemist be asked to submit to the Science Committee full particulars of cases of important deficiencies in analysis, so that the Committee may report to the Board on the expediency of the names of the vendors and full details being issued to the members of the Society in confidential prints.

This was agreed to.

Vetting of Clydesdale Stallions.

A letter was read from the Secretary to the Board of Agriculture thanking the Directors for deciding in favour of the veterinary inspection of stallions in accordance with the Board's regulations.

After some discussion, the Directors resolved that the condition as to the registering of Clydesdale Stallions in the Register of Certified Draught Stallions, published by the Board of Agriculture, should apply only to those Horse Associations receiving the Society's grant, for the first year, after April 1911, the date on which the resolution was adopted by the Directors.

Medals for Horticulture.

A letter was read from the Secretary of the Glasgow and West of Scotland Horticultural Society asking for a grant of medals on the occasion of its Centenary Show. The Directors agreed to grant six medals.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 7TH JUNE 1911.

Mr SCOTT PLUMMER of Sunderland Hall, in the Chair.

New Members.

249 candidates were duly balloted for and admitted as members.

Free Life Members.

The following winners of the Society's First-class Certificate in Forestry at the examination in April last were elected free life members in terms of the Bye-Laws :—
Davidson, John D., Brimstage, Birkenhead.

Doull, Donald, M.A., A.R.C.Sc., High School, Kelso.

Office-Bearers.

The following office-bearers of the Society were elected for the ensuing year :—

President—Lord Ninian Crichton Stuart, M.P., House of Falkland, Falkland.

Vice-Presidents—The Earl of Elgin and Kincardine, K.G., Broomhall, Dunfermline; the Earl of Strathmore, Glamis Castle, Glamis; Sir John Gilmour of Montrave, Bart., Leven.

Ordinary Directors—Sir Arch. Buchan Hepburn, Bart. of Smeaton, Prestonkirk; Mr Charles Douglas of Auchlochan, Lesmahagow; Mr James M'Laren, Alton, Stirling; Captain Gilmour, yr. of Montrave, M.P., Woodburne, Ceres; Mr C. H. Scott Plummer of Sunderland Hall, Selkirk; Mr John Marr, Uppermill, Tarves; Mr C. M. Cameron, Balnakyle, Munloch; Mr John M. Aitken, Norwood, Lockerbie.

Extraordinary Directors—The Provost of Cupar, Sir Ralph Anstruther of Balcaskie, Bart., Pittenweem; Sir John Dewar, Bart., M.P., Dupplin Castle, Perth; the Hon. A. D. Murray, Scones Lethendy, Perth; Mr Laurence Johnston of Sands, Kincardine-on-Forth; Mr T. A. Buttar, Corston, Coupar-Angus; Mr Mungall of Transy, Dunfermline; Mr William Tod of East Brackley, Kinross; Mr R. C. Munro Ferguson, M.P., of Raith, Kirkcaldy; Mr Arch. Whyte, Inverquhar, Kirriemuir; Mr W. T. Malcolm, Dunmore, Larbert; Mr W. H. Ralston, Dunragit Estates Office, Dunragit; Mr D. M'Lean, Dunrobin, Golspie; Mr James I. Davidson, Saughton Mains, Corstorphine; Mr John M. Martin, Craufurd, Lasswade; Mr J. Campbell Murray, 216 West George Street, Glasgow; Mr F. W. Christie, Castlefield, Cupar-Fife; Mr C. H. Howatson of Glenbuck, Glenbuck; Mr A. Agnew Ralston, Philpstoun House, Philpstoun.

The CHAIRMAN said that since these gentlemen had been nominated Colonel Home Drummond, who had been appointed a vice-president, had died, and it was not proposed for the present to fill up the vacancy.

The proposal was made that a vacancy among the Extraordinary Directors should be filled up by the appointment of Mr Huntly Macdonald, Inverness.

Mr GEORGE A. FERGUSON, Surradale, thought the Inverness district was very well represented already, and that Morayshire should have one other representative at least. He proposed Mr M. H. M. Mackay, Elgin. There was no seconder, and Mr Huntly Macdonald was declared elected.

Inverness Show, 1911.

Mr C. M. CAMERON, Balnakyle, reported that the arrangements are well advanced for the Show of the Society to be held at Inverness on Tuesday, 25th July, and three following days. The town of Inverness had, as usual, supported the Society cordially, giving an excellent site and a supply of water free of charge, and in addition contributing a sum of £50 to the funds of the Show. The County Councils of Inverness, Ross and Cromarty, Caithness, and Nairn had raised subscriptions in aid of the Show by means of voluntary assessments on owners of land, while subscriptions have been intimated from individual proprietors as well as from agricultural societies, as follows :—

Inverness-shire Farmers' Society, £25; Nairnshire Farming Society, £20; Black Isle Farmers' Society, £20. The prize-money, including £40 lately announced from

the Board of Agriculture to supplement the prizes for Highland Pony Stallions, will reach a total of £2870, nearly £100 more from the Society's own funds than at the last Highland Show at Inverness.

Cupar Show of 1912.

Mr DAVID FERRIE, Parbroath, reported on the arrangements for the Show of 1912, to be held at Cupar-Fife on Tuesday, 9th July, and three following days. The town of Cupar had provided a suitable site less than a mile from the railway station, and this, with a supply of water, is given free of charge, along with a subscription of £200 towards the funds of the Show. Contributions to the funds are being raised in the counties of Fife and Kinross by means of voluntary assessments on owners of lands and heritages. He might also add that the North British Railway Company were improving the station by raising the existing platforms, and other alterations.

Show of 1913.

Mr C. M. DOUGLAS of Auchlochan stated that for the Show of 1913, which falls to be held in the Glasgow Show District, applications had been received from Glasgow, Paisley, Ayr, and Lanark. A Committee of Directors had been appointed to consider the applications and report to the Board of Directors, the Committee being authorised to visit the different centres if thought desirable. That Committee, he added, was drawn entirely from members of the Board representing districts which had no claim on the Show of 1913.

Election of Directors.

The resolutions as amended at the meeting of the Directors earlier in the day were unanimously agreed to, on the motion of the CHAIRMAN, seconded by Mr A. H. ANDERSON, Kippendavie.

Agricultural Education.

Mr ALEX. CROSS of Knockdon submitted the report on the result of the examination held at Leeds in April last for the National Diploma in Agriculture. Ninety-seven candidates presented themselves. Fifty-two were examined in Part I., and twenty-eight passed. Of the forty-five candidates who came forward for Part II., twenty-nine were successful in gaining the National Diploma. Nine of the candidates were from Scotland, five of them receiving the diploma. Five candidates obtained honours, none of them being from Scotland.

Forestry Department.

Sir ARCH. BUCHAN HEPBURN, Bart., reported that the Forestry Examination was held from the 11th to the 13th April last, when six candidates came forward. Two of the candidates obtained the first-class certificate and one the second-class certificate. The examiners had reported very favourably on the enhanced standard attained by the candidates as compared with those in former years.

Report by Chemist.

Mr JAMES HENDRICK, Chemist to the Society, submitted his usual report on analyses made for members of the Society.

Botanist's Report.

Professor M'ALPINE, Botanist to the Society, reported as follows: I have the honour to report that during the present season (1910-11), I have examined 318 samples of agricultural seeds for purity and germination.

The following table shows the maximum and minimum germination and the maximum and minimum purity of the various grasses and clovers tested:—

	Max. germination per cent.	Min. germination per cent.	Max. purity per cent.	Min. purity per cent.
CLOVERS—				
Red	100	90	100	93
Alsike	100	88	99	95
White	99	90	100	90
GRASSES—				
Perennial ryegrass	96	87	100	93
Italian ryegrass	97	80	99	86
Timothy	98	85	100	95
Cocksfoot	98	64	98	76
Tall oat-grass	99	86	98	81
Meadow fescue	98	93	100	96
Tall fescue	97	94	98	86
Rough-stalked meadow grass	95	88	97	89

Cannon Firing and the Rainfall.

The Earl of STAIR suggested that the Society should make a representation to the Admiralty to the effect that as far as possible war vessels off the coast of Scotland should avoid firing their heavy guns during the months of August and September. At that critical period of the year for the farmer the discharging of these guns burst the rain-clouds, to the great disadvantage of agriculturists.

Mr A. H. ANDERSON seconded Lord Stair's proposal, and it was unanimously agreed to.

A cordial vote of thanks was accorded Mr Scott Plummer for presiding, on the motion of the Earl of STAIR.

A similar compliment was paid Lord Stair, on the motion of Mr GORDON of Newton, for the great interest he had shown in the affairs of the Society during the year of his occupancy of the President's chair.

GENERAL MEETING IN THE INVERNESS SHOWYARD.

The usual General Meeting of the Highland and Agricultural Society was held in the New Meeting Room in the Showyard. Lord Lovat, the President of the Society, occupied the chair, and there was a large attendance.

Sir ARCHIBALD BUCHAN HEPBURN proposed a vote of thanks to the Provost, Magistrates, and Town Council of Inverness for their assistance and co-operation in furthering the success of the Show, in providing a suitable site free of charge, and for their liberal contribution to the fund. At no place, he said, had they received a keener welcome and greater assistance than at Inverness.

Mr WILLIAM DUTHIE, Collynie, seconded, and the motion was carried unanimously.

Provost BIRNIE acknowledged.

Captain GILMOUR, M.P., moved a vote of thanks to the subscribers to the fund in aid of the Show, and to the donors of special prizes for their liberal support. In this connection he said they owed particular thanks to the Board of the Highland Railway Company, who gave a handsome contribution of £50 towards the prize-list.

Major CARRUTHERS of Dormont, Lockerbie, seconded, and the motion was adopted.

Mr C. M. DOUGLAS of Auchlochan moved a vote of thanks to Sir John Macpherson Grant, Bart. of Ballindalloch, the Convener, and to the other members of the Local Committee.

Dr SHIRRA GIBB, Boon, Lauder, seconded, and the resolution was carried.

Sir JOHN MACPHERSON GRANT, in reply, said it had been a very great pleasure to the Committee to act on behalf of the Society, and the pleasure had not been lessened by the thought that at the head of the Society this year was their popular President, Lord Lovat.

Regulations as to Election of Directors.

Mr SCOTT PLUMMER moved the following resolution, which had previously been approved by two meetings of Directors and by the General Meeting on 7th June: "That the By-Laws and Regulations of the Society relating to the nomination, election, and retirement of Directors of the Society be altered so as to provide as follows, viz.: (1) That a member who has been twice nominated and has served, or is in process of serving, two full consecutive terms of four years each as an ordinary Director, shall not be eligible to be again nominated or elected as an ordinary Director till after the lapse of at least one year. (2) That the Board of Directors, in nominating the extraordinary Directors other than the Show Directors of the year, shall have power to nominate members resident in or connected with important divisions of the Show districts, that have for four or more years been without direct representation on the Board of Directors by an ordinary Director, it being provided that those particular members shall be eligible for nomination and election as extraordinary Directors whether or not they have had previous experience of the business of the Society, but that not more than four such extraordinary Directors shall hold office at one time." He said it had been felt for some time past by a good many members of the Society, that the Board of Directors had perhaps been rather too much in a ring fence, and there had also been complaints that some districts of the country had not had their proper share of representation. The resolutions which he had proposed were intended, as far as possible, to correct that disadvantage under which the Society had laboured. Under the proposed regulations, when a Director had served two terms of office he would be obliged to retire and some one else must be nominated. This would compulsorily introduce

new blood into the Directorate. It would, of course, be open after a term of four years for a district to re-elect a Director who had retired. The second resolution was brought forward for the purpose of meeting the disadvantageous position of the district removed from the Show centres which had not been sufficiently represented in the past, and which might not be sufficiently represented under the first regulation. It permitted the Directors to nominate as extraordinary Directors gentlemen from those districts which had not had direct representation for some time. They hoped that this would widen the area of the representation on the Board, which they considered was most essential to the welfare of the Society. He might point out that they had put in four Directors. They were allowed, however, under the present charter to elect ten extraordinary Directors in this manner, but all the ten Directors must have had experience on the Board. The intention of that rule was that Directors who had been very useful to the Society might be continued after they had ceased to be ordinary Directors. They had put in a proviso here that these gentlemen who were elected in this way should not necessarily have had previous experience, and this gave the Directors an opportunity to add any one who was a desirable addition to the Board. If the resolution were passed at that meeting these regulations would immediately become effective.

Mr W. T. MALCOLM, Dunmore, seconded.

A Plea for Popular Representation.

Colonel M'INROY, of The Burn, Edzell, proposed amendments to both of the clauses of the resolution. In regard to the first section, he proposed "That any member who has served as an ordinary Director for a term of four years shall be ineligible to be again nominated until after the lapse of at least one year." In all societies with which he was acquainted the term of a Director, without going out, was either three, four, or five years. Eight years, in his opinion, was rather a lengthened period for one to be on the Board. He considered that four years was an ample period for a Director to serve. Let them have new blood rather more frequently. (Applause.) He did not think any complaint could be made of four years being the terminal period of a Director's single service. As to the second clause, he proposed the deletion of the concluding phrase—"But that not more than four such extraordinary Directors shall hold office at any time." He explained that he was far from wishing to increase the number of Directors, but to limit it as suggested in the resolution to four would just leave things as they were to a great extent. If the Directors were limited to four extraordinary Directors, there would be jealousy as to which of the divisions were to have representation. It should be left to the Directors to appoint as many as necessary to fill the unrepresented divisions.

Mr DAVID R. ARNOT, Mains of Edzell, seconded.

Mr A. MACNEILAGE, Glasgow, who supported the amendment, said there was no better rule in any Society than that an ordinary Director, after having served for the period for which he was elected, should not be eligible for re-election for one year. That was one of the best rules ever invented for maintaining the popularity of the governing body of any Society.

After further discussion, a vote was taken. On the first amendment being put to the meeting it was supported by a considerable majority, and was declared carried. The second amendment was also adopted.

Royal Scottish Agricultural Benevolent Institution.

Mr C. M. CAMERON, Balnakyle, moved the following resolution: "Considering the good work of the Royal Scottish Agricultural Benevolent Institution in rendering pecuniary assistance to, and relieving distress among, aged and infirm members (male and female) of the agricultural class in Scotland who, through no fault of their own, are reduced to circumstances of extreme need, this meeting resolves to strongly commend the laudable objects of the Institution to the favourable consideration and support of all interested in Scottish agriculture."

Mr HUNTLY MACDONALD of Torbreck seconded, and the resolution was unanimously adopted.

The Colouring of Blackfaced Sheep.

Major T. W. CUTHBERT, Ardross, brought forward a matter in connection with the Blackfaced Sheep section. Some two years ago, he believed, a resolution had been considered by the Directors to the effect that blackfaced sheep ought to be shown in their natural fleeces, and that no colouring be allowed. A petition had, however, come in from the Blackfaced Breeders' Society opposing the proposal, and the Directors gave way. It was evident from the exhibition in the Blackfaced Sheep section at that Show that matters had come to such a pass that colouring must not be allowed or the sheep would be spoiled. This opinion had been generally expressed by breeders in the Showyard. He would earnestly ask the Directors

to reconsider the whole matter, and he hoped they would see their way to introduce a rule at next Show.

Mr J. J. R. MEIKLEJOHN, factor, Novar, seconded.

The CHAIRMAN—The resolution, duly proposed and seconded, will be brought before the Directors at their next meeting.

The Development of the Highland Pony.

Lord LOVAT, at the close of the business, alluded to the work of the Society during the past year. He thought it could be said that the Society had held the even tenor of its way during the last year, and had done, and continued to do, that excellent work for Scotland generally which it had performed in the past. In the Clydesdale section, they had passed new regulations regarding veterinary examination, which the Directors hoped would tend to the betterment of the breed. The Directors had also continued the scientific work for which the Society was so justly famed. The Society had been well served in this department of its work under the very capable chairmanship of Mr Scott Plummer. On the question of Highland ponies, he had received a good many letters during the last few days. He thought the Highland pony was a line of development which the Highland Society could pursue with great advantage. At the present time, when consideration was being paid not only to the large but to the small holder, it would be advisable for breeders of the Highland pony to take steps to improve that very important breed. They had in the meantime—or rather in the immediate future—a Sub-Committee dealing through the Development Grant Commissioners with the subject of the improvement and standardisation of those ponies. Although he did not enter into politics, at all events he would say that the reorganisation of the Congested Districts Board, and the extension of their sphere of influence perhaps, came within prospect. Regarding the remount department of the War Office, Lord Lovat appealed to breeders to unite upon common action, believing that the time was most opportune for unity, and that no division or elements of discord should appear in the ranks of such an important Society as theirs. From his own military experience in Yeomanry and otherwise he could testify to the value of the Highland pony. They had an animal which not only carried out the ordinary uses of the farm, but also possessed national value. It would be very unfortunate if the Breed Societies, together with the Highland and Agricultural Society, could not come forward with some definite resolutions for the improvement of the breed. In conclusion, he paid a tribute to the Judges and to the Secretariat.

On the motion of the Earl of STAIR, seconded by Mr J. M. MARTIN, a vote of thanks was given to the President.

ANNIVERSARY GENERAL MEETING, 10TH JANUARY 1912.

Sir ARCHD. BUCHAN HEPBURN in the Chair.

205 candidates were balloted for and admitted as members.

Mr CROSS, Vice-Convenor of the Finance Committee, submitted the Accounts of the Society for the year to 30th November. The receipts for the year from all sources reached a total of £12,235, while the expenditure amounted to £13,110, making an excess of expenditure of £875. This balance of expenditure arises principally from a special item of extraordinary expenditure appearing in this year's accounts, amounting to £1460, from the amount of the special donations, £550, and from the loss on the Inverness Show, £261—together, £2271. The local subscriptions for the Inverness Show amounted to £1371, showing that without these subscriptions there would have been a loss on the Show of £1652. In the past year the expenditure on educational work came to £195; on dairy work, £271; and on the work in the chemical and botanical departments, £242.

Argyll Fund.

Captain GILMOUR submitted the Accounts of the Argyll Naval Fund, which showed that the income for the year was £228, 5s. 2d., while the expenditure was £200, in grants of £40 each to five naval cadets. He said that, owing to the large number of applicants, they could not give as much as they would like. Still, they had done the best they could under the circumstances.

Inverness Show.

Mr C. M. CAMERON reported regarding the Inverness Show of 1911. The weather, on the whole, was favourable, and the attendances throughout were very good. The

site, granted free by the town of Inverness, was an ideal one for a showyard, and made the conditions for moving about of a pleasant description. The local fund reached the handsome total of £1891. The live stock, in almost all the classes, showed a high standard of excellence. Notwithstanding the great distance from the large centres of manufacture, the display of implements and machines was highly creditable.

Cupar Show of 1912.

Mr DAVID FERRIE, Parbroath, Vice-Convener of the Local Committee, reported that the arrangements are well advanced for the Show of this year, to be held at Cupar on Tuesday, 9th July, and three following days. The town of Cupar has provided a suitable site free of charge for the Showyard in Kinloss Parks, about three-quarters of a mile from Cupar Railway Station. The Corporation of Cupar have also agreed to give a subscription of at least £200, and a supply of water free of charge. The County Councils of Fife and Kinross have agreed to raise subscriptions to the local fund by means of a voluntary assessment upon owners of lands and heritages. It is to be hoped that subscriptions will also be raised in the eastern division of Perthshire and in the western division of Forfarshire. The premium list for the Show will be exceptionally liberal, the prize-money from the Society's own funds reaching a total of £2771, an increase of £196 over the sum offered at the Perth Show of 1904, and £206 over the amount offered at Inverness Show last year. He might say, further, that the arrangements had been carried forward as far as possible. The Cupar Town Council had raised its £200. They had made roadways into the Showyard, the railway station had been modernised, they had got a perpetual challenge cup of the value of not less than £100 to signalise the visit of the Society to Fife, and the Fife Fox Hunt was to contribute £60.

Show of 1913.

Mr ALEXANDER CROSS of Knockdon reported that the Committee appointed by the Directors to inspect centres for the Show of 1913 visited in October last the following places, from which invitations had been received to hold the Show of 1913—viz., Lanark, Ayr, Paisley, and Glasgow. On the recommendation of the Committee, the Directors, at their meeting on the 1st of November, unanimously agreed to hold the Show for 1913 at Paisley. The town of Paisley has agreed to give, free of charge, a very fine site for the Showyard, with a plentiful supply of water also free. The site is on the race-course, about 50 acres in extent, and within half a mile of two railway stations, where there is ample accommodation for both passengers and stock. The Town Council of Paisley have also agreed to give a contribution of £250, besides promoting a local subscription towards the Show fund. The County Council of Bute has agreed to raise a subscription to the local fund by means of a voluntary assessment, and it is to be hoped that the County Councils of Lanark, Ayr, and Renfrew will also raise similar subscriptions. The Renfrewshire Agricultural Society have agreed to abandon their Show for 1913.

The report was unanimously agreed to.

Provost MUIR MACKEAN, Paisley, thanked the Directors and the members for their decision, and said no effort would be spared by the people and the Town Council of Paisley to make the Show a success. The Show in Paisley would give a great impetus to the Society, for they would be tapping a large, populous, and wealthy district. They had already heard of 95 new members having been added to the roll by Renfrewshire, and he believed that was only the beginning.

Show of 1914.

Mr SCOTT PLUMMER moved that, provided a suitable site is available, and satisfactory financial and other arrangements can be made, the Society's Show of 1914 be held in the Border district. He thought he could assure the Society that if they came to the Border district they would have a cordial welcome. Several places intended to compete for the Show.

Mr DAVID WILSON of Carbeth seconded, and the motion was agreed to.

Regulations for Nomination and Election of Directors.

The resolution approved at the meeting of Directors earlier in the day was submitted.

Colonel M'INROY of The Burn said he had noticed this resolution referred to in the newspapers as the M'Inroy Resolution. He did not consider that that was right. It was his amendment to the Directors' resolution.

The CHAIRMAN said that that had arisen through their seeking the opinion of counsel, a distinctive name having to be applied to the matter in hand.

Mr GORDON of Newton said he desired to move an amendment to the resolution, and he did so all the more freely now that he had been sent to the "House of Lords,"

and did not require to seek re-election owing to his official position. He would move that the first part of the resolution be deleted. If a man was only allowed to serve for four years he was not able to become fully acquainted with the work of the Board and the Society. The first part of the resolution interfered very much with the action of the districts in electing the men to the Board of the Highland and Agricultural Society, which were most desired. It looked a little like domination from headquarters in Edinburgh of the members in the country.

Mr C. M. CAMERON seconded.

Colonel M'INROY said he did not think it was necessary for him to make any lengthened observations in moving the approval of the resolution as it stood. At a very representative meeting of members in Inverness this resolution was carried by a very large majority. If that decision was altered now, it delayed the whole matter for two years. Let them take his own district. There were five Directors, including his friend of the "House of Lords," and in the case of four of these they could almost cover them with a tablecloth. (Laughter.) The Aberdeenshire people could do pretty much as they liked, and Kincardineshire and East Forfarshire were nowhere.

Mr THOMAS ELDER, Stevenson Mains, Haddington, in seconding, said he was greatly surprised that any amendment should be proposed at this stage. No motion which had been passed at any general meeting of the Society had given so much satisfaction as that one. By means of this resolution they would have more life and more energy introduced into the directorate. He knew of no agricultural society in Scotland which was in so much need of new blood as the Highland and Agricultural Society of Scotland. If they overturned the resolution at that meeting they would hear more about it. He thought Mr Gordon should withdraw his proposal.

On a division, the resolution was approved by 24 votes to 18 given in support of Mr Gordon's amendment.

District Shows.

Mr JOHN MARR submitted the report on the district Shows and competitions, showing that in 1911 grants of money and medals had been given in 303 districts. The total expenditure under this head amounted to £639. For the current year the Directors proposed the following grants: (1) Under Section 1, eighteen districts for grants of £12 each; fifteen districts for three silver medals each; (2) Under Section 2, twelve districts for grants of £15 each for stallions; special grants of £40 for Highland Home Industries; £20 to Kilmarnock Cheese Show; £5 each to Ross-shire Crofters' Club and Shetland Agricultural Association; £3 each to West Mainland, Rousay, South Ronaldshay, and Burray; a gold medal and a silver medal to the British Dairymaids' Association; eighteen districts for two medals each; about 200 medals at ploughing competitions; and fifteen districts for two medals each for cottages and gardens—making the total sum offered in 1912 £587.

Mr ALEX. CROSS seconded, and the report was approved.

Forestry.

Mr R. C. MUNRO FERGUSON, M.P., moved that the annual grant of £50 to the Lectureship on Forestry in the University of Edinburgh be continued for the current year.

Captain GILMOUR seconded, and it was agreed to.

Education.

Mr ALEX. CROSS reported on the results of the examination held last autumn for the National Diploma in Dairying. At the examination in England there were 33 candidates, of whom 15 obtained the diploma and 18 failed; at the examination at Kilmarnock there were 42 candidates, 20 getting the diploma and 22 failing. The names of the successful candidates, as well as the names of the winners of the National Diploma in Agriculture at the examination held at Leeds last May, will be published in the next volume of the 'Transactions.'

Science.

Mr HENDRICK, consulting Chemist to the Society, reported on the work of his department during 1911.

A vote of thanks to the Chairman concluded the proceedings.

APPENDIX

PREMIUMS

OFFERED BY

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND IN 1912

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GENERAL NOTICE.

THE HIGHLAND SOCIETY was instituted in the year 1784, and incorporated by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have since been continuously directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to **THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND**.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of the United Kingdom are allowed to compete.

2. A system of District Shows instituted for the purpose of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.

3. The encouragement of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising the Society to grant Diplomas to Students of Agriculture; and by giving grants in aid of education in Agriculture and allied sciences. In 1900 the Society discontinued its own Examination, and instituted jointly with the Royal Agricultural Society of England an Examination for a National Diploma in Agriculture.

4. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise. Terminated in 1881 in accordance with arrangements with the Royal College of Veterinary Surgeons.

5. The institution of a National Examination in Dairying, jointly with the Royal Agricultural Society of England.

6. The institution of an Examination in Forestry for First and Second Class Certificates.

7. The appointment of a chemist for the purpose of promoting the application of science to agriculture.

8. The establishment of a Botanical Department.

9. The appointment of Entomologist to advise members regarding insect pests.

10. The annual publication of the 'Transactions,' comprehending papers by selected writers, Prize Reports, and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications.

11. The management of a fund left by John, 5th Duke of Argyll (the original President of the Society), to assist young natives of the Highlands who enter His Majesty's Navy.

CONSTITUTION AND MANAGEMENT.

The general business of **THE HIGHLAND AND AGRICULTURAL SOCIETY** is conducted under the sanction and control of the Royal Charters, referred to above, which authorise the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty-two Ordinary and Twenty Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers.

The Supplementary Charter of 1856 provides for the appointment of a Council on Education, consisting of Sixteen Members—Nine nominated by the Charter, and Seven elected by the Society.

PRIVILEGES OF MEMBERS

MEMBERS OF THE SOCIETY ARE ENTITLED—

1. *To receive a free copy of the 'Transactions' annually.*
2. *To apply for District Premiums that may be offered.*
3. *To report Ploughing Matches for Medals that may be offered.*
4. *To Free Admission to the Shows of the Society.*
5. *To exhibit Live Stock and Implements at reduced rates.¹*
6. *To have Manures and Feeding-Stuffs analysed at reduced fees.*
7. *To have Seeds tested at reduced fees.*
8. *To have Insect Pests and Diseases affecting Farm Crops inquired into.*
9. *To attend and vote at General Meetings of the Society.*
10. *To vote for the Election of Directors, &c., &c.*

ANALYSIS OF MANURES AND FEEDING-STUFFS

The Fees of the Society's Chemist for Analyses made for Members of the Society shall, until further notice, be as follow:—

The estimation of one ingredient in a manure or feeding-stuff	5s.
The estimation of two or more ingredients in a manure or feeding-stuff	10s.

These charges apply only to analyses made for the sole and private use of Members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed.

The Society's Chemist, if requested, also supplies valuations of manures, according to the Society's scale of units.

SEEDS, CROP DISEASES, INSECT PESTS, &c.

The rates of charges for the examination of plants and seeds, crop diseases, insect pests, &c., will be had on application to the Secretary.

ELECTION OF MEMBERS

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June. It is not necessary that the proposer should attend the Meeting.

CONDITIONS OF MEMBERSHIP

Higher Subscription.—The ordinary annual subscription is £1, 3s. 6d., and the ordinary subscription for life-membership is £12, 12s.; or after ten annual payments have been made, £7, 7s.

Lower Subscription.—Proprietors farming the whole of their own lands, whose rental on the Valuation Roll does not exceed £500 per annum, and all Tenant-Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors resident on Estates, Land Stewards, Foresters, Agricultural Implement Makers, and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, are admitted on a subscription of 10s. annually, which may be redeemed by one payment of £7, 7s., and after eight annual payments of 10s. have been made, a Life Subscription may be purchased for £5, 5s., and after twelve such payments, for £3, 3s.² Subscriptions are payable on election, and afterwards annually in January.

Members are requested to send to the Secretary the names and addresses of Candidates they have to propose (stating whether the Candidates should be on the £1, 3s. 6d. or 10s. list).

....., Secretary.

3 GEORGE IV. BRIDGE, EDINBURGH.

¹ Firms are not admitted as Members; but if one partner of a firm becomes a Member, the firm is allowed to exhibit at Members' rates.

² Candidates claiming to be on the 10s. list must state under which of the above designations they are entitled to be placed on it.

ESTABLISHMENT FOR 1911-1912

President.

LORD NINIAN CRICHTON STUART, M.P., House of Falkland, Falkland.

Vice-Presidents.

EARL OF ELGIN AND KINCARDINE, K.G., Broomhall, Dunfermline.

EARL OF STRATHMORE, Glamis Castle, Glamis.

SIR JOHN GILMOUR of Montrave, Bart., Leven, Fifeshire.

WALTER STEUART FOTHERINGHAM of Fotheringham and Murthly, Perthshire.

Ordinary Directors.

Year of
Election.

1908	JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
	WILLIAM TAYLOR, Park Mains, Renfrew.
	W. S. FERGUSON, Pictstonhill, Perth.
	DAVID WILSON, D.Sc., of Carbeth, Killearn.
	THOMAS GORDON DUFF of Drummuir, Keith.
	Colonel ROBERT F. DUDGEON of Cargen, C.B., Dumfries.
	SIR JOHN MACPHERSON-GRANT of Ballindalloch, Bart.
1909	H. M. LEADBETTER, Knowesouth, Jedburgh.
	Captain THOMAS HOPE of Bridge Castle, Bathgate.
	ALEXANDER CROSS of Knockdon, 19 Hope Street, Glasgow.
	A. H. ANDERSON, Kippendavie Estate Office, Dunblane.
	The MARQUIS OF TULLIBARDINE, M.P., M.V.O., D.S.O., Blair Castle, Blair Atholl.
	Dr R. SHIRRA GIBB, Boon, Lauder.
	JOHN M'CAIG of Belmont, Stranraer.
1910	WILLIAM DUTHIE, Tarves, Aberdeenshire.
	P. B. MACINTYRE, Mains of Findon, Conon Bridge.
	J. T. M'LAREN, The Leuchold, Dalmeny Park, Edinburgh.
	JAMES WILSON, Westburn, Cambuslang.
	J. ERNEST KERR, Harviestoun Castle, Dollar.
	Major F. J. CARRUTHERS of Dormont, Lockerbie.
	DAVID FERRIE, Parbroath, Cupar-Fife.
1911	E. DOUGLAS PATON, Braehead, St Boswells.
	Captain ALEX. T. GORDON, yr. of Newton, Inch, Aberdeenshire.
	J. DOUGLAS FLETCHER of Rosehaugh, Avoch, R.S.O., Ross-shire.
	CHARLES DOUGLAS of Auchlochan, Lesmahagow.
	Captain JOHN GILMOUR, M.P., yr. of Montrave, Woodburne, Ceres, Fife.
	JAMES M'LAREN, Alton, Stirling.
	SIR ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk.
	JOHN MARR, Upper Mill, Tarves.
	JOHN M. AITKEN, Norwood, Lockerbie.
	C. M. CAMERON, Balnakyle, Munlochy, Ross-shire.
	C. H. SCOTT PLUMMER of Sunderland Hall, Selkirk.

Extraordinary Directors.

- 1905 WILLIAM T. MALCOLM, Dunmore, Larbert.
 1909 W. H. RALSTON, Dunragit Estate Office, Dunragit.
 DONALD M'LEAN, Dunrobin, Golspie.
 1910 { JAMES I. DAVIDSON, Saughton Mains, Corstorphine.
 JOHN M. MARTIN, Craufurd, Lasswade.
 F. W. CHRISTIE, Castlefield, Cupar-Fife.
 J. CAMPBELL MURRAY, 216 West George Street, Glasgow.
 CHARLES HOWATSON of Glenbuck, Glenbuck.
 1911 { A. AGNEW RALSTON, Philipstoun House, Philipstoun.
 J. HUNTLY MACDONALD, Torbreck, Inverness.

Shew Directors.

- 1911 { JAMES STARK, Provost of Cupar-Fife.
 Hon. A. D. MURRAY, Scones Lethendy, Perth.
 Sir RALPH ANSTRUTHER of Balcaskie, Bart., Pittenweem.
 Sir JOHN A. DEWAR, Bart., M.P., Dupplin Castle, Perth.
 The Right Hon. R. C. MUNRO FERGUSON of Raith, M.P., Kirkcaldy.
 LAURENCE JOHNSTON of Sands, Kincardine-on-Forth.
 WILLIAM MUNGALL of Transy, Dunfermline.
 WILLIAM TOD of East Brackley, Kinross.
 T. A. BUTTAR, Corston, Coupar-Angus.
 ARCHIBALD WHYTE, Inverquhar, Kirriemuir.

Office-Bearers.

....., *Treasurer.*
 ALEXANDER M. GORDON of Newton, Inch, *Honorary Secretary.*
 Rev. A. WALLACE WILLIAMSON, D.D., 44 Palmerston Place, Edinburgh,
Chaplain.
 , *Secretary.*
 JOHN MACDIARMID, *Interim Secretary.*
 EDWARD M. COWIE, *Chief Clerk and Cashier.*
 A. S. CAVERS, *Second Clerk.*
 WILLIAM HOME COOK, C.A., 42 Castle Street, *Auditor.*
 JAMES HENDRICK, B.Sc., F.I.C., Agricultural Department, Marischal
 College, Aberdeen, *Chemist.*
 Professor R. STANFIELD, A.R.S.M., M.Inst.C.E., F.R.S.E., 24 Mayfield
 Gardens, Edinburgh, *Consulting Engineer.*
 A. N. M'ALPINE, 6 Blythswood Square, Glasgow, *Consulting Botanist.*
 R. S. MACDOUGALL, M.A., D.Sc., 9 Dryden Place, *Consulting Entomologist.*
 TODS, MURRAY, & JAMIESON, W.S., 66 Queen Street, *Law Agents.*
 WILLIAM BLACKWOOD & SONS, 45 George Street, *Printers and Publishers.*
 KEITH & Co., 43 George Street, *Advertising Agents.*
 G. WATERSTON & SONS, 35 George Street, *Stationers.*
 THOMAS SMITH & SONS, 47 George Street, *Silversmiths.*
 ALEXANDER KIRKWOOD & SON, 9 St James' Square, *Medallists.*
 JOHN WATHERSTON & SONS, 29 Queensferry Street, *Inspectors of Works.*
 D. MACANDREW & Co., 120 Loch Street, Aberdeen, *Showyard Contractors.*
 WILLIAM SIMPSON, *Messenger.*

Chairman of Board of Directors.

SIR ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart.

Chairmen of Committees.

- | | |
|--|-------------------------------------|
| 1. <i>Argyll Naval Fund</i> . . . | Captain JOHN GILMOUR M.P. |
| 2. <i>Finance, Chambers, and Law</i> . . . | ALEX. CROSS of Knockdon. |
| 3. <i>Publications</i> . . . | DAVID WILSON, D.Sc., of Carbeth. |
| 4. <i>Shows</i> . . . | ALEX. M. GORDON of Newton. |
| 5. <i>Science</i> . . . | DAVID WILSON, D.Sc., of Carbeth. |
| 6. <i>General Purposes</i> . . . | DAVID WILSON, D.Sc., of Carbeth. |
| 7. <i>Education</i> . . . | |
| 8. <i>Forestry</i> . . . | SIR ARCHIBALD BUCHAN HEPBURN, Bart. |

COMMITTEES FOR 1911-1912

1. ARGYLL NAVAL FUND.

Captain JOHN GILMOUR, M.P., yr. of Montrave, Woodburne, Ceres, *Convener*.
 J. PATTEN MACDOUGALL, C.B., 39 Heriot Row, Edinburgh.
 JOHN MACLACHLAN of Maclachlan, 48 Castle Street, Edinburgh.
 Sir KENNETH MACKENZIE of Gairloch, Bart., 10 Moray Place, Edinburgh.
 The MARQUIS OF TULLIBARDINE, M.P., M.V.O., D.S.O., Blair Castle,
 Blair Atholl.
 DAVID WILSON, D.Sc., of Carbeth, Killearn.
 Sir ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk.

2. FINANCE, CHAMBERS, AND LAW.

ALEXANDER CROSS of Knockdon, 19 Hope Street, Glasgow, *Convener*.
 JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 W. S. FERGUSON, Pictstonhill, Perth.
 JAS. I. DAVIDSON, Saughton Mains, Corstorphine.
 DAVID WILSON, D.Sc., of Carbeth, Killearn.
 Sir ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk.
 C. H. SCOTT PLUMMER of Sunderland Hall.
 A. M. GORDON of Newton, Inch, Aberdeenshire, Hon. Secretary, *ex officio*.
 WILLIAM HOME COOK, C.A., Auditor, *ex officio*.

3. PUBLICATIONS.

DAVID WILSON, D.Sc., of Carbeth, Killearn, *Convener*.
 Dr R. SHIRRA GIBB, Boon, Lauder.
 JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 JOHN WILSON, Chapelhill, 6 Mansionhouse Road, Edinburgh.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 Sir ARCHIBALD BUCHAN HEPBURN Bart., *ex officio*.

4. SHOWS.

ALEX. M. GORDON of Newton, Inch, Aberdeenshire, *Convener*.
 JOHN MARR, Upper Mill, Tarves.
 W. S. FERGUSON, Pictstonhill, Perth.
 ALEX. CROSS of Knockdon, 19 Hope Street, Glasgow.
 J. D. FLETCHER of Rosehaugh, Avoch, R.S.O., Ross-shire.
 C. M. CAMERON, Balnakyle, Munlochy.
 WILLIAM DUTHIE, Tarves, Aberdeenshire.
 Colonel ROBERT F. DUDGEON of Cargen, C.B., Dumfries.

JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 JOHN M'CAIG of Belmont, Stranraer.
 WILLIAM TAYLOR, Park Mains, Renfrew.
 A. H. ANDERSON, Kippendavie, Dunblane.
 E. DOUGLAS PATON, Braehead, St Boswells.
 J. ERNEST KERR, Harviestoun Castle, Dollar.
 THOMAS GORDON DUFF of Drummuir, Keith.
 SIR JOHN MACPHERSON-GRANT of Ballindalloch, Bart.
 W. T. MALCOLM, Dunmore, Larbert.
 The MARQUIS OF TULLIBARDINE, M.P., M.V.O., D.S.O., Blair Castle.
 DAVID FERRIE, Parbroath, Cupar-Fife.
 Major F. J. CARRUTHERS of Dormont, Lockerbie.
 Captain THOMAS HOPE of Bridge Castle, Bathgate.
 H. M. LEADBETTER, Knowesouth, Jedburgh.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 Captain JOHN GILMOUR, M.P., yr. of Montrave, Woodburne, Ceres.
 J. HUNTLY MACDONALD, Torbreck, Inverness.
 JAMES WILSON, Westburn, Cambuslang.
 Captain ALEXR. T. GORDON, Combscausway, Inch, Aberdeenshire.
 P. B. MACINTYRE, Mains of Findon, Conon Bridge.
 F. W. CHRISTIE, Castlefield, Cupar.
 John M. Martin, Craufurd, Lasswade.
 C. H. SCOTT PLUMMER of Sunderland Hall.
 WILLIAM MUNGALL of Transy, Dunfermline.
 JAMES M'LAREN, Alton, Stirling.
 T. A. BUTTAR, Corston, Coupar-Angus.
 ARCHIBALD WHYTE, Inverquhar, Kirriemuir.
 Professor R. STANFIELD, 24 Mayfield Gardens, Edinburgh, *ex officio*.
 SIR ARCHIBALD BUCHAN HEPBURN, Bart., *ex officio*.

5. SCIENCE.

DAVID WILSON, D.Sc., of Carbeth, Killearn, *Convener*.
 Dr R. SHIRRA GIBB, Boon, Lauder, *Vice-Convener*.
 W. S. FERGUSON, Pictstonhill, Perth.
 ALEX. CROSS of Knockdon, 19 Hope Street, Glasgow.
 JOHN WILSON, Chapelhill, 6 Mansionhouse Road, Edinburgh.
 JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 JOHN M'CAIG of Belmont, Stranraer.
 C. H. SCOTT PLUMMER of Sunderland Hall, Selkirk.
 THOMAS GORDON DUFF of Drummuir, Keith.
 J. M. AITKEN, Norwood, Lockerbie.
 SIR ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk.
 The MARQUIS OF TULLIBARDINE, M.P., M.V.O., D.S.O., Blair Castle.
 DAVID FERRIE, Parbroath, Cupar-Fife.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 JAMES WILSON, Westburn, Cambuslang.
 J. CAMPBELL MURRAY, 216 West George Street, Glasgow.
 JOHN M. MARTIN, Craufurd, Lasswade.
 JAMES HENDRICK, Chemist, *ex officio*.
 A. N. M'ALPINE, Botanist, *ex officio*.
 R. S. MACDOUGALL, D.Sc., *ex officio*.
 SIR ARCHIBALD BUCHAN HEPBURN, Bart., *ex officio*.

6. GENERAL PURPOSES.

DAVID WILSON, D.Sc., of Carbeth, Killearn, *Convener*.
 JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 SIR ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk.
 JOHN WILSON, Chapelhill, 6 Mansionhouse Road, Edinburgh.

JAMES I. DAVIDSON, Saughton Mains, Corstorphine.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 Captain THOS. HOPE of Bridge Castle, Westfield.
 JOHN M'CAIG, of Belmont, Stranraer.
 ALEX. CROSS of Knockdon, 19 Hope Street, Glasgow.
 ALEX. M. GORDON of Newton, Inch, *ex officio*.

7. EDUCATION.

DAVID WILSON, D.Sc., of Carbeth, Killearn.
 ALEXANDER CROSS of Knockdon, 19 Hope Street, Glasgow.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 Dr R. SHIRRA GIBB, Boon, Lauder.
 The SECRETARY.
 Sir ARCHIBALD BUCHAN HEPBURN, Bart., *ex officio*.

8. FORESTRY.

Sir ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., Prestonkirk, *Convener*.
 The MASTER OF POLWARTH, Humble House, Upper Keith.
 A. M. GORDON of Newton, Inch, Aberdeenshire.
 The Right Hon. R. C. MUNRO FERGUSON of Raith, M.P., Kirkcaldy.
 JOHN METHVEN, 15 Princes Street, Edinburgh.
 Colonel F. BAILEY, 7 Drummond Place, Edinburgh.
 DAVID KEIR, Ladywell, Dunkeld.
 JOHN MICHIE, M.V.O., Balmoral, Ballater.
 THOMAS GORDON DUFF of Drummur, Keith.
 The MARQUIS OF TULLIBARDINE, M.P., M.V.O., D.S.O., Blair Castle.
 DAVID WILSON, D.Sc., of Carbeth, Killearn.
 Captain JOHN GILMOUR, M.P., yr. of Montrave, Woodburne, Ceres.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 EARL OF STAIR, Lochinch, Castle Kennedy Station.
 Captain STIRLING of Keir, Dunblane.
 Right Hon. Sir HERBERT E. MAXWELL of Monreith, Bart., Whauphill.
 A. H. ANDERSON, Kippendavie, Dunblane.
 Sir JOHN MACPHERSON-GRANT of Ballindalloch, Bart.
 Lord LOVAT, C.B., K.C.V.O., A.D.C., Beaufort Castle, Beaulieu.
 Sir JOHN STIRLING MAXWELL of Pollok, Bart., Pollokshaws.

9. OFFICE-BEARERS.

JOHN M'HUTCHEN DOBBIE, Campend, Dalkeith.
 E. DOUGLAS PATON, Braehead, St Boswells.
 WILLIAM DUTHIE, Tarves.
 ALEX. CROSS of Knockdon, 19 Hope Street, Glasgow.
 W. S. FERGUSON, Pictstonhill, Perth.
 Sir JOHN MACPHERSON-GRANT of Ballindalloch, Bart.
 A. H. ANDERSON, Kippendavie, Dunblane.
 Major F. J. CARRUTHERS of Dormont, Lockerbie.
 WILLIAM TAYLOR, Park Mains, Renfrew.
 JAMES WILSON, Westburn, Cambuslang.
 CHARLES DOUGLAS of Auchlochan, Lesmahagow.
 ALEX. M. GORDON of Newton, Inch, Aberdeenshire, *ex officio*.
 Sir ARCHIBALD BUCHAN HEPBURN of Smeaton, Bart., *ex officio*.

The President, Vice-Presidents, the Treasurer, Honorary Secretary, and Chairman of Directors are members *ex officio* of all Committees.

REPRESENTATIVES ON OTHER BODIES.**National Agricultural Examination Board.**

ALEX. CROSS of Knockdon, 19 Hope Street, Glasgow.

CHARLES DOUGLAS of Auchlochan, Lesmahagow.

DAVID WILSON, D.Sc., of Carbeth, Killearn.

Dr R. SHIRRA GIBB, Boon, Lauder.

....., *Secretary.*

West of Scotland Agricultural College.

JOHN M. MARTIN, Craufurd, Lasswade.

Edinburgh and East of Scotland College of Agriculture.

Dr R. SHIRRA GIBB, Boon, Lauder.

....., *Secretary.*

Aberdeen and North of Scotland College of Agriculture.

T. GORDON DUFF of Drummur, Keith.

WILLIAM DUTHIE, Tarves.

Royal (Dick) Veterinary College.

JOHN M. MARTIN, Craufurd, Lasswade.

Glasgow Veterinary College.

ALEX. CROSS of Knockdon, 18 Hope Street, Glasgow.

MEETINGS.

General Meetings.—By the Charter the Society must hold two General Meetings each year, and, under ordinary circumstances, they are held in the months of January and June, in the Society's Hall, 3 George IV. Bridge, for the election of Members and other business. Twenty a quorum.

By a resolution of the General Meeting on 15th January 1879, a General Meeting of Members is held in the Showyard on the occasion of the Annual Show. This year it will be held at Cupar-Fife, on Wednesday, 10th July, at an hour to be announced in the programme of the Show.

With reference to motions at General Meetings, Bye-Law No. 10 provides—"That at General Meetings of the Society no motion or proposal (except of mere form or courtesy) shall be submitted or entertained for immediate decision unless notice thereof has been given a week previously to the Board of Directors, without prejudice, however, to the competency of making such motion or proposal to the effect of its being remitted to the Directors for consideration, and thereafter being disposed of at a future General Meeting."

General Show at Cupar-Fife.—9th, 10th, 11th, and 12th July.—Entries close for Implements, 6th May; Stock, Poultry, and Dairy Produce, 31st May.

Directors' Meetings.—The Board of Directors meet (except when otherwise arranged) on the first Wednesday of each month from November till June inclusive, at half-past one o'clock P.M., and occasionally as business may require, on a requisition by three Directors to the Secretary, or on intimation by him. Seven a quorum.

Committee Meetings.—Meetings of the various Committees are held as required.

Nomination of Directors.—Meetings of Members, for the purpose of nominating Directors to represent the Show Districts on the Board for the year 1913-1914, will be held at the places and on the days after mentioned :—

- | | |
|--|---------------------------------|
| 1. Edinburgh, Market Buildings, Gorgie, | Wed., 29th Jan. 1913, at 2. |
| 2. Glasgow, North British Railway Hotel, | Wed., 12th Feb. 1913, at 1. |
| 3. Stirling, Golden Lion Hotel, . . . | Thur., 13th Feb. 1913, at 1.30. |
| 4. Perth, Salutation Hotel, . . . | Fri., 14th Feb. 1913, at 2. |
| 5. Kelso, Ante-room, Corn Exchange, . | Fri., 21st Feb. 1913, at 1. |
| 6. Aberdeen, Imperial Hotel, . . . | Fri., 28th Feb. 1913, at 2.30. |
| 7. Inverness, Station Hotel, . . . | Tues., 4th Mar. 1913, at 12.30. |
| 8. Dumfries, King's Arms Hotel, . . . | Wed., 12th Mar. 1913, at 1. |

The nomination of Proprietor or other Members paying the higher subscription must be made in the 1st, 2nd, 4th, and 5th Districts; and the nomination of Tenant-Farmer or other Members paying the lower subscription, in the 3rd, 6th, 7th, and 8th Districts.

EXAMINATIONS.

Agriculture.—The Examination for 1912 for the National Diploma in Agriculture will be held at the University, Leeds, on Saturday, 20th April, and following days. Entries close on 1st March.

Dairy.—The Examination for 1912 for the National Diploma in Dairy-ing will be held at the Dairy School, Kilmarnock, on Saturday, 21st September, and following days. Entries close on 15th August.

Forestry.—The Examination for the Society's Certificates in Forestry will be held at 3 George IV. Bridge, Edinburgh, on 8th, 9th, and 10th April 1913. Entries close on 7th March.

AGRICULTURAL EDUCATION

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

From 1858 to 1899 the Society held an annual Examination for Certificate and Diploma in Agriculture. In 1872 the Free Life Membership of the Society was granted to winners of the Diploma. In 1884 permission was given to holders of the Diploma to append the letters F.H.A.S. to their names.

In 1898 it was resolved by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland to discontinue the independent Examinations in Agriculture held by the two Societies, and to institute in their stead a Joint-Examination for a NATIONAL DIPLOMA IN AGRICULTURE (N.D.A.) This Examination is now conducted under the management of the "National Agricultural Examination Board" appointed by the two Societies. In the year 1903, on the invitation of the two Societies, the Board of Agriculture and the Scotch Education Department agreed to appoint a representative from each to act on the Examination Board. Professor Middleton represents the former and Sir John Struthers, K.C.B., LL.D., the latter body.

*NEW REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF AGRICULTURE.

REGULATIONS.

1. The Societies may hold conjointly, under the management of the National Agricultural Examination Board appointed by them, an annual Examination in the Science and Practice of Agriculture, at a convenient centre.

2. Candidates who pass the Examination will receive the National Diploma in Agriculture—the Diploma to be distinguished shortly by the letters "N.D.A."

3. The Examination will be conducted by means of written papers and oral Examinations.

4. In order to be eligible to sit for the Board's Examination in Agriculture, a Candidate must :—

(a) Present a certificate from a recognised Agricultural College that his attainments in the subjects of *General Botany, Geology, General Chemistry, Physics and Mechanics*, as attested by class and other examinations are, in the opinion of the authorities of the College, such as to justify his admission to the Board's Examination ; or

(b) Produce evidence that he has passed the 1st B.Sc. or the Intermediate Examination in Science of a British University ; or

(c) Present a Senior Certificate obtained at the Local Examinations of the Universities of Oxford or Cambridge, and produce evidence that

he has continued his study of science for at least a year, and has obtained a certificate in subject 3 (a) Elementary Chemistry and Physics, (b) Botany of Group H of the Oxford Higher Local Examination, or in Subjects 1, Elementary Chemistry and Physics, and 4, Botany of Group E of the Cambridge Higher Local Examination; or

(d) Present an Intermediate Leaving Certificate of the Scotch Education Department, and produce evidence that he has continued his studies for at least another year and has obtained the Higher Leaving Certificate in Science (including Chemistry and Botany).

5. In the case of students who satisfy the Board that they have not had the facilities for obtaining the foregoing certificates, the Board will be prepared to consider evidence of equivalent attainment.

6. Candidates will have the option of taking the whole of the following eight papers at one time, or of sitting for a group of any four in one year and the remaining group of four in the next year.

SUBJECT.	Maximum Marks.	Pass Marks.
1. Practical Agriculture (First Paper)	300	180
2. Practical Agriculture (Second Paper)	300	180
3. Farm and Estate Engineering—		
(a) Surveying		
(b) Farm Buildings		
(c) Machinery and Implements		
4. Agricultural Chemistry	300	150
5. Agricultural Botany	300	150
6. Agricultural Book-keeping	200	100
7. Agricultural Zoology	200	100
8. Veterinary Science	200	100
	2100	1110

7. A Candidate who obtains not less than three-fourths (1575) of the aggregate maximum marks (2100) in the entire Examination will receive the Diploma with Honours, provided that he obtains not less than three-fourths (450) of the maximum marks (600) in the two Practical Agriculture papers.

8. Candidates electing to take the entire Examination at one time and failing in not more than two subjects may appear for these subjects in the following year. Failure in more than two subjects will be regarded as failure in the whole Examination.

9. Candidates electing to take the Examination papers in two groups and failing in a single subject may appear for that subject in the following year. Failure in more than one subject will be regarded as failure in the group.

10. Non-returnable fees must be paid by Candidates as follows:—

Entire Examination	Two guineas.
Group of Four Subjects	One guinea.
One or two Subjects	Ten shillings.

11. The Board reserve the right to postpone, abandon, or in any way, or at any time, modify an Examination, and also to decline at any stage to admit any particular Candidate to the Examination.

**In addition to an Examination under the above conditions, to meet the cases of students who had already commenced their training before the issue of these Regulations, Examinations will, at the same time, be conducted in Parts I. and II. UNDER THE OLD REGULATIONS, copies of which may be obtained on application. After 1912 no further Examination will be held in Part I.*

The Examinations will take place at the Leeds University on SATURDAY, APRIL 20th, 1912, and following days.

Forms of application for permission to sit at the Examinations may be obtained from "The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.," or from "The Secretary, Highland and Agricultural Society of Scotland, 3 George IV. Bridge, Edinburgh," and must be returned duly filled up not later than FRIDAY, MARCH 1, 1912, when the Entries will close.

SYLLABUS OF SUBJECTS OF EXAMINATION.

PRACTICAL AGRICULTURE.

I.—FIRST PAPER.

1. *British Farming*.—Arable, stock-raising, dairying—Approximate areas covered by the different systems—Typical examples of each—Area in Great Britain under chief crops—Numbers of live stock—The recent history of agriculture—Short summary of agricultural returns.

2. *Climate*.—The effect of climate on farming practice—Rainfall—Temperature—Prevailing winds—Weather forecasts.

3. *Soils*.—The influence of geological formations on the systems of farming—Classification of soils—Character and composition—Suitability for cultivation—Reclamation—Drainage—Irrigation—Warping—Application of lime and marl—Bare fallows—Tillage—Subsoiling—Deep and thorough cultivation.

4. *Manures*.—The manures of the farm—The treatment of farmyard manure—The disposal of liquid manure and sewage—General manures—Special manures—Field trials of manures—The application of manures—Period of application and amounts used per acre—Unexhausted value of manures and feeding-stuffs.

5. *Crops*.—Wheat, barley, oats, rye, beans, peas, potatoes, turnips, swedes, mangolds, forage plants, hops and other crops—Their adaptation to different soils and climates—Varieties—Selection of seed—Judging seeds—Cultivation, weeds and parasitic plants, best methods of prevention and eradication—Harvesting—Storing—Cost of production—Improvement of crops by selection and hybridising—Field trials—Methods which the farmer may adopt—Selection to resist disease—The principles of rotations—Rotations suitable for different soils and climates—Rotations and the maintenance of fertility—Green manuring—Leguminous crops in rotation—Catch crops—The advantages and disadvantages of rotations—Specialised farming.

II.—SECOND PAPER.

6. *Live Stock*.—The different breeds of British live stock—Their origin, characteristics, and comparative merits—Suitability for different districts—Breeding—General principles—Selection—Mating—Crossing—Rearing and general management—Breeding and rearing of horses, cattle, sheep, pigs and poultry—Rearing colts and raising store stock—The foods of the farm—Their composition and suitability for different classes of stock—Purchased foods—Composition and special value—Rations for different kinds and ages of stock—Cost of producing beef, mutton, pork, and milk—Cost of feeding farm horses.

7. *The disposal of Crop, Produce, and Stock.*—Marketing grain and other crops—Sale of stock—Live weight—Dead weight.

8. *Milk.*—The production and treatment of milk—The manufacture of cheese, butter, &c.—The utilisation of by-products.

9. *Farming Capital.*—Calculations of the stocking and working of arable, stock, and dairy farms—Labour on the farm—Farm valuations—Rent and taxes.

10. *Renting a Farm.*—Indications of condition, productive power, and stock-carrying capacity—Leases—Conditions of occupancy.

N.B.—*It is essential that a Candidate know his subject practically, and that he satisfy the Examiner of his familiarity with farm routine.*

III.—FARM AND ESTATE ENGINEERING.

1. The use and adjustment of instruments employed in Surveying and Levelling.

2. Land surveying by chain—Plotting from field book, and determination of areas surveyed—The simpler "field problems."

3. Levelling and plotting from field book.

4. A sufficient knowledge of Trigonometrical Surveying for the determination of heights and distances by Theodolite.

5. A knowledge of the various classes of maps published by the Ordnance Survey Department and their Scales.

6. *Roads, Fences, and Land Drainage.*—The construction and maintenance of farm roads, fences, and ditches—Drains, and cost.

7. *Buildings.*—Buildings required on different classes of farms—Economic arrangement of farm buildings—Materials—Construction—Ventilation—Drainage—Water supply—Dimensions of dairy, stables, cow-sheds, yard, courts, and piggeries—Accommodation for power—Implement, machinery, and cart sheds—Hay and grain sheds—Shelter sheds—Storage of manure—Approximate cost of farm buildings for sizes of farms and system of farming.

8. *Power.*—Steam, gas, and oil engines, motors, water wheels, windmills and horse gears—Cost and working expenses.

9. *Agricultural Implements.*—Ploughs—Cultivators—Harrows—Rollers—Horse hoes, &c.—Drills—Broadcast and other sowing machines—Planters—Sprayers—Manure distributors—Mode of action and general principles—Adjustments—Lubrication—Care of machinery—Prices.

10. *Implements of Harvesting.*—Reaping machines—Mowing machines—Rakes—Teddies—Sweeps—Elevators—Potato raisers.

11. *Implements of Transit.*—Carts, waggons, rick lifters, traction engines, motors.

12. *Threshing and Food-preparing Machinery.*—Threshing machines, screens, winnowers—Hummelers, chaff cutters—Pulpers—Cake breakers.

13. *Dairy Appliances.*—Milking machines—Cream separators—Churns and other butter-working appliances—Milk delivery cans—Cheese-making utensils—Vats and presses.

N.B.—*Each Candidate should have with him at the Examination a pair of compasses, scales of equal parts, including a scale of one chain to an inch, and the scale fitting the Ordnance map, $\frac{1}{2500}$ or 25·344 inches to the mile, a small protractor, a set square, and a straight-edge about 18 inches in length.*

Candidates will be expected to illustrate their answers, when necessary, by intelligible sketches or diagrams, and to show a knowledge of mode of action and general principles.

IV.—AGRICULTURAL CHEMISTRY.

1. *The Atmosphere*.—Its composition and relations to plant and animal life.

2. *Water*.—Rain water—Soil water and drainage—Drinking water—Sewage and irrigation.

3. *The Soil*.—Origin, formation, and classification of soils—Sampling—Analysis—Composition of soils—The chemical and physical properties of soils—The water and air of the soil—Biological changes in the soil—The soil in relation to plant growth—Fertility—Causes of infertility—Improvement of soils.

4. *Manures*.—Theories of manuring—Classification of manures—Origin, nature, and characteristics of manures—Manufacture of manures—Composition, analysis, adulteration, and valuation of manures—Farmyard manure and other natural manures—Green-manuring—Liming, marling, claying—Artificial manures, their origin and manufacture—Fertilisers and Feeding Stuffs Act—Sampling of manures.

5. *Poisons, Antiseptics, and Preservatives*.—General chemical composition and character of insecticides, fungicides, antiseptics, and preservatives used on the farm.

6. *Plants and Crops*.—Constituents of plants—Assimilation and nutrition of plants—Sources of the nitrogen and other constituents of plants—Germination—Action of enzymes—Composition and manurial requirements of farm crops—Food products derived from crops—Manuring experiments.

7. *Animals*.—Composition of animal body—Animal nutrition—Digestion—Assimilation, metabolism, respiration, and excretion.

8. *Foods and Feeding*.—Constituents of foods—Origin, nature, and composition of chief feeding-stuffs—Sampling, analysis, and adulteration of foods—Nutritive value and digestibility of food—Functions of chief food constituents—Energy values—Relation of foods to the production of work, meat, milk, and manure—Manurial residues of foods.

9. *Dairy Chemistry*.—The composition of milk, cream, butter, cheese, &c.—Conditions which influence the composition of milk and milk products—Action of ferments and enzymes on milk and milk products—Milk-testing—Analysis and adulteration of dairy products.

N.B.—Candidates are required to bring their Laboratory Notes to the Oral Examination in this subject.

V.—AGRICULTURAL BOTANY.

In addition to a general knowledge of the morphology, histology, and physiology of plants, candidates will be expected to possess a detailed knowledge of the following subjects:—

British grasses of agricultural importance: recognition of at any stage of growth. Habitats of important species. Constitution of the grass flora of good meadows and pastures. Composition of seed mixtures for temporary and permanent leys on various soils. The effects of artificial manures on the flora of grass land.

The weeds of arable and grass land. Poisonous and parasitic weeds. Methods of distribution by seed and vegetatively: of eradication. Weeds as soil indicators. Recognition of the seeds of the common weeds, particularly those characteristically found in clover, grass, &c., seed.

The chief varieties of wheat, barley, oats, clovers, roots, and other farm crops: their suitability for various climatic and soil conditions. The identification of the more important types of cereals by means of their grain-characters. Characteristics of good and bad samples of cereals.

Materials used in feeding-cakes and meals : identification of.

Grafting, pruning, and the management of orchards.

Plant-breeding. Principles of heredity in plants. Pure lines. Fluctuating variability. Selection.

Disease in plants. Diseases due to the attacks of parasitic fungi. Resistance to disease : conditions affecting. The life-history of the more important species of *Plasmodiophora*, *Synchytrium*, *Phytophthora*, *Peronospora*, *Sphaerotheca*, *Nectria*, *Claviceps*, *Sclerotinia*, *Ustilago*, *Tilletia*, *Puccinia*, *Polyporus*, *Armillaria*, and of any fungoid diseases scheduled from time to time by the Board of Agriculture and Fisheries.

Yeasts and fermentation.

The general outlines of bacteriology : nitrogen fixation, nitrification, and denitrification. Putrefaction and the bacteriology of milk, butter, and cheese.

VI.—AGRICULTURAL BOOK-KEEPING.

Principles of book-keeping ; single and double entry ; opening books, description of subsidiary books, with examples of entries therein ; the ledger ; posting ; preparation of trial balance ; valuation of stocks and effects ; closing and proving the books, preparation of profit and loss account and balance sheet ; ruling off accounts.

Application of special methods to farms of varying requirements.

VII.—AGRICULTURAL ZOOLOGY.

1. The part played by common animals in helping or hindering agricultural operations, as illustrated by moles and voles, insectivorous and other birds, snails and slugs, useful and injurious insects, arachnids and myriapods, earthworms, &c.

2. *General Structure of Insects*, especially the external characters.

3. *Life-history of Insects*.—Economic importance of different stages. A knowledge of the life-history of the principal insect pests as affording a basis for appropriate treatment.

4. *Classification of Insects*.—The general characters of the following Natural Orders : Coleoptera, Lepidoptera, Hymenoptera, Diptera, Hemiptera, Orthoptera, Neuroptera.

5. *Acarina* injurious to Food Crops and Live Stock.

6. *Parasitic Worms*.—Flukes, Tapeworms, and Threadworms.

7. *Preventive and Remedial measures* in regard to insects, acarines, and worm Parasites—e.g., farm practice in relation to the discouragement of Insect Attack. Encouragement of insect-eating birds and mammals. Artificial remedies. Insecticides. Treatment for Parasites.

N.B.—*Practical acquaintance with common animals, especially insects and worm parasites, will be expected. Where the Candidate is not acquainted with the scientific name of an animal, the generally received English name will be accepted. Candidates are required to bring their Laboratory Notes to the Oral Examination in this subject.*

VIII.—VETERINARY SCIENCE.

1. Elementary Anatomy and Physiology of the horse, ox, sheep, and pig.

2. The general principles of breeding—including the physiology of reproduction, the laws of heredity, the periods of gestation, and the signs of pregnancy in the mare, cow, ewe, and sow.

3. Dentition as a means of determining the age of horses, cattle, sheep, and swine.

4. The management of farm stock in health and disease.

The following won the Diploma in 1911 :—

Diploma with Honours.

FREDERICK KEITH JACKSON, Leeds University.
 THOMAS HAMILTON, Leeds University.
 GEORGE CHRISTOPHER MARTIN, Leeds University.
 E. ERNEST W. PAYNTER, Leeds University.
 GORDON BURDASS YOUNG, Harper-Adams Agricultural College, Newport,
 Salop.

Diploma.

ONNIG J. BALABANIAN, West of Scotland Agricultural College, Glasgow.
 WILLIAM JAMES BERRY, College of Agriculture and Horticulture, Holmes
 Chapel, Cheshire.
 BENJAMIN BUNTING, College of Agriculture and Horticulture, Holmes
 Chapel, Cheshire.
 THOMAS ELSEY CARTER, Midland Agricultural and Dairy College, King-
 ston, Derby.
 FRANK EWART CORRIE, West of Scotland Agricultural College, Glasgow.
 AUSTIN EASTWOOD, Harris Institute, Preston.
 WILLOUGHBY VICTOR FOOT, University College, Reading.
 JAMES SIMPSON GREEN, Aberdeen and North of Scotland College of Agri-
 culture, Aberdeen.
 ROBERT HALL, Harris Institute, Preston.
 JOHN JENNINGS, Royal College of Science, Dublin.
 MATTHEW RANKIN JOHNSTON, Midland Agricultural and Dairy College,
 Kingston, Derby.
 ARTHUR REGINALD LAMBERT, Harper-Adams Agricultural College, New-
 port, Salop.
 PATRICK WILLIAM MACKENZIE, Aberdeen and North of Scotland College
 of Agriculture, Aberdeen.
 GEORGE NORMAN MAURICE MORRELL, Leeds University.
 ROBERT PARK, Harris Institute, Preston.
 JOHN SAMUEL POWNALL, Midland Agricultural and Dairy College, King-
 ston, Derby.
 ALFRED ERNEST ROBERTS, Harris Institute, Preston.
 JONATHAN ALAN ROBOTHAM, Harper-Adams Agricultural College, New-
 port, Salop.
 JOHN PERCY THOMPSON, Harris Institute, Preston.
 HERBERT WIGNALL, Harris Institute, Preston.
 DENNIS WILLIAM WOOD, Harper-Adams Agricultural College, Newport,
 Salop.
 JAMES HERBERT WOOD, Leeds University.
 WILLIAM AIREY YATES, Harris Institute, Preston.
 JOHN McDONALD YOUNG, West of Scotland Agricultural College, Glasgow.

EXAMINATION PAPERS OF PAST YEARS.

Copies of the Papers set at the Annual Examinations for the National Diploma in the Science and Practice of Agriculture, held from 1905 to 1911, may, as far as available, be had upon application. Price 6d. per set.

VETERINARY DEPARTMENT

The Society established a Veterinary Department in 1823, but by an arrangement made with the Royal College of Veterinary Surgeons, the Society's examination ceased in 1881. Holders of the Society's Veterinary Certificate are entitled to become Members of the Royal College of Veterinary Surgeons on payment of certain fees, without being required to undergo any further examination. The number of Students who passed for the Society's Certificate is 1183.

The Society votes annually eleven silver medals for Class Competition to each of the two Veterinary Colleges in Scotland, the one in Edinburgh and the other in Glasgow.

FORESTRY DEPARTMENT

THE Society grants FIRST and SECOND CLASS CERTIFICATES in FORESTRY.

1. An Examination will be held each alternate year about the month of April.

2. Next Examination will be held on 8th, 9th, and 10th April 1913. Entries close on 7th March.

3. Candidates must possess—1. A thorough acquaintance with the theory and practice of Forestry. 2. A general knowledge of the following branches of study, so far as these apply to Forestry: (a) The Elements of Botany and Forest Zoology; (b) The Elements of Physics, Chemistry, and Meteorology; (c) Forest Engineering, including Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to fencing, draining, bridging, road-making, and saw-mills; and Implements of Forestry; (d) Book-keeping and Accounts.

4. The examinations are open to candidates of any age, may be both written and oral, and will include such practical tests as may from time to time be decided to apply.

5. The maximum number of marks for each subject is 100; Pass marks for First-Class Certificate—Forestry, 75; all other subjects, 60. Pass marks for Second-Class Certificate—Forestry, 60; all other subjects, 50.

6. A Candidate who obtains Pass marks in certain subjects, but fails in others, may come up for these other subjects alone, it being understood that without the special permission of the Society no Candidate will be eligible to enter for more than two subsequent examinations.

7. A Candidate who has obtained the Second-Class Certificate may enter again for the First-Class Certificate.

The list of students who obtained certificates prior to 1899 appears in the 'Transactions,' Fifth Series, vol. xi. (1899).

The following have since obtained First-Class Certificates:—

ERIC ARTHUR NOBBS, Department of Agriculture, Cape Town,	1899
GEORGE POTTS, Grey College, Bloemfontein, Orange River Colony,	1899
DUNCAN S. RABAGLIATI, 1 St Paul's Road, Bradford,	1901
FRANK SCOTT, Dumfries House Mains, Cumnock,	1903
WILLIAM T. STOCKLEY, Rose Villa, Garswood, near Wigan,	1906
A. FRANK WILSON, C.D.A. (Edin.), Reedieleys, Auchtermuchty,	1907

GEORGE FISHER, Farm Brook, Pilling, Garstang, Lancs., .	1909
JOHN PATTEN, jun., Hulne Park, Alnwick, ...	1909
ALEXANDER MITCHELL, Dalmeny Park, Edinburgh, ...	1909
JOHN D. DAVIDSON, Brimstage, Birkenhead, ...	1911
DONALD DOULL, M.A., A.R.C.Sc., High School, Kelso, ...	1911

The following have since obtained Second-Class Certificates :—

WILLIAM BRUCE, B.Sc., East of Scotland College of Agriculture, Edinburgh, ...	1901
RAJAPPIER SWAMINATHAN, 56 Jesus Lane, Cambridge, ...	1901
THOMAS USHER, Courthill, Hawick, ...	1901
ALLAN CARRUTH, Lawmarnock, Kilbarchan, ...	1905
ALEX. M. LUMSDEN, Newburn Schoolhouse, Upper Largo, ...	1905
ROBERT M. WILSON, Laws Cottage, Duns, ...	1905
THOMAS CAMPBELL, Greystoke, Penrith, ...	1906
DONALD FERGUSON, Quarry Lane, Lennoxtown, ...	1906
CHARLES PENRYN ACKERS, Huntly Manor, Gloucester, ...	1908
ROBERT HOWIE, Beechwood, Arbroath, ...	1908
JOHN TROTTER, B.Sc., 5 Argyle Park Terrace, Edinburgh, ...	1908
JAMES A. S. WATSON, Downieken, Dundee, ...	1908
NORMAN H. PEARSON, 52 Percy Park, Tynemouth, ...	1909
LIONEL F. STOBART, Royal Agricultural College, Cirencester, ...	1911

SYLLABUS OF EXAMINATION

I.—SCIENCE OF FORESTRY AND PRACTICAL MANAGEMENT OF WOODS.

I. *Principles of Scientific Forestry*.—1. Effects of heat, light, moisture, and air-currents on forest vegetation. 2. Effects of depth, porosity, moisture, and chemical composition of the soil on forest vegetation. 3. Effects of forest vegetation on the soil and air. 4. Rate and extent of development, longevity, and reproductive power of trees. 5. Pure and mixed woods. 6. Systems of silviculture.

II. *Forest Organisation*.—7. General ideas regarding a regulated system of forest management. 8. Knowledge of working plans of forests.

III. *Practical Management of Woods*.—9. Draining and irrigation. 10. Choice of species for various situations. 11. Seed and sowing, including nurseries. 12. Planting. 13. Natural regeneration by seed, shoots, and suckers. 14. Formation of mixed woods. 15. Tending of young woods. 16. Pruning. 17. Thinning. 18. Silvicultural characteristics of the principal trees.

IV. *Injuries by Storms and Fires*.—19. Storms. 20. Fires.

V. *Timber*.—21. Its technical properties. 22. Its defects. 23. Recognition of different kinds of timber. 24. Processes for increasing its durability.

VI. *Utilisation of Produce*.—25. Uses of wood and other produce. 26. Felling. 27. Conversion. 28. Seasoning. 29. Transport. 30. Sales. 31. Harvesting of bark.

II.—FOREST BOTANY AND FOREST ZOOLOGY.

(a) FOREST BOTANY.

The fundamental facts of morphology, physiology, and classification of plants. The structure and function of the plant-cell and the plant-tissues. Their primary distribution. The secondary changes they exhibit in consequence of perennation.

The structure and function of the root and shoot in flowering-plants. Buds, their forms and uses. The flower. The fruit. The seed.

The structure and function of vegetative and reproductive organs of fungi.

Relationship of plants to air, soil, and water. Effect of light, heat, and mechanical agencies upon plants. Nutrition. The nature and elements of the food of plants. Sources of plant-food. The absorption, elaboration, transference, and storage of food. Respiration and transpiration. Parasites and saprophytes. Symbiosis.

Growth of plants in length and thickness. Correlation of growth, pruning. Germination of seeds. Formation of wood and bark. Healing of wounds.

Diseases of plants due to faulty nutrition and unfavourable circumstances of growth. Diseases due to attacks of fungi.

Natural reproduction and propagation by seeds and by buds. Fertilisation of flowers. Hybridisation. Artificial propagation by budding, grafting, layering, and cutting.

The characters of the large groups and classes of the vegetable kingdom. The characters of the families of plants which include the chief timber trees. The botanical characteristics of the principal British forest-trees (including the structural features of their wood). The weeds of the forest and their significance.

(b) FOREST ZOOLOGY.

The group Insecta: its position in the animal kingdom. Structure, mode of reproduction, and metamorphosis of insects. The outlines of classification of the group. Conditions favourable to the numerical increase of insects. Natural checks to increase (*e.g.*, birds, mammals, parasitic insects). The identification and life-history of the more important insects injurious to forest-trees and fruit-trees. The damage caused by these insect pests and their mode of attack. The damage caused by animals. Preventive and remedial measures.

III.—PHYSICS, CHEMISTRY, AND METEOROLOGY.

Physics.

Mass, weight, specific gravity, solid, liquid, and gaseous states of matter. Capillarity, osmose, vapour tension, suction pump, force pump, syphon, barometer, atmospheric pressure. Boyle's law. Levers and pulleys. Heat, measurement of heat, specific heat; transference of heat by conduction, convection, and radiation. Boiling and freezing. Latent heat. The thermometer. The conservation and transformation of energy. Light—reflection, refraction, polarisation; the spectrum. The rudiments of electricity and magnetism.

Chemistry.

Elements. Oxygen, hydrogen, nitrogen,—their preparation, properties, and chief compounds. Acids, bases, salts. Combustion, oxidation, reduction. Sulphur, carbon, phosphorus; and their compounds, with oxygen and hydrogen. Metals—potassium, sodium, calcium, magnesi-

um, aluminium, iron, copper, lead, mercury, and their chief compounds. Carbohydrates, marsh gas, olefiant gas, alcohol, acetic acid, oxalic acid. Distillation of wood and coal.

Meteorology.

The atmosphere, its composition and physical properties. Measurement of pressure and temperature. The barometer. Rain, hail, snow, fog, cloud, dew, the dew-point, hoar frost. The weathering of rocks and soils. Gases injurious to vegetation.

IV.—FOREST ENGINEERING, INCLUDING LAND AND TIMBER MEASURING AND SURVEYING; MECHANICS AND CONSTRUCTION AS APPLIED TO FENCING, BRIDGING, ROAD-MAKING, AND SAWMILLS.

1. The use of the level and measuring-chain. Measuring and mapping surface areas. 2. The measurement of solid bodies—as timber, stacked bark, fagots, &c., earthwork. 3. The different modes of fencing and enclosing plantations; their relative advantages, durability, cost of construction, and repairs. 4. The setting out and formation of roads for temporary or permanent use. 5. The construction of bridges over streams and gullies; of gates or other entrances. 6. The construction and working of estate saw-mills.

V.—ARITHMETIC—BOOK-KEEPING.

1. Arithmetic—including Practice, Proportion, and Decimal Fractions. 2. Book-keeping—including the description of books to be kept, and the solution of practical questions in Book-keeping and the preparation of Accounts.

EXAMINATION PAPERS, 1911

PRACTICAL FORESTRY.

1. A matured Scots Pine wood, 50 acres in extent, is to be sold by private tender, the trees to be sold standing. As no regular system of thinning has been observed the trees are irregular in size, large and small stems occurring in mixture over the whole area. You are requested by the owner to prepare the timber for sale, and to supply him with a private estimate of the volume and value of the whole. How would you proceed (1) with regard to the preparation of the lot; and (2) in estimating its volume and value?

2. State what you know of the principles governing the management of a two-storeyed forest. Give a list of light-demanding and shade-enduring species, and show from which combinations the highest economic results may be obtained, special regard being had to local, as opposed to continental, conditions of climate, soil, and value of product.

3. Describe the attack of the root fungi *Trametes radiciperda* and *Agaricus melleus*, and the conditions in woodlands most favourable to their growth and dissemination. Give a list of the trees on which they occur parasitically or saprophytically, and state the preventive and remedial measures you would apply (1) in the case of a young Scots Pine plantation infected in small patches by the former, and (2) in a matured spruce wood infected by the latter, which it is proposed to cut over and

renew. In the former case, would you favour the introduction of a prophylactic, and if so which species would you recommend? and with regard to the latter, which species would you recommend for the formation of the new crop, both soil and climate being suitable for the cultivation of broad-leaved trees and exotic coniferæ?

4. A Scots Pine forest in an exposed locality is nearing maturity, and it is intended to restock the ground by the natural regeneration of the species. The crop is below normal density, and the soil on part of the area is covered with a tufted growth of grass, while the remainder is covered by heath or bracken. How would you proceed (1) with the preparation of the floor for the proper germination of the seeds; and (2) on which system would you conduct operations?

5. A forester is handed an order for sawn timber for renewing a farmstead, and he has to supply round timber to the saw-mill to cut the order from. Large-sized trees are scarce on the estate, and it is imperative that only logs of suitable size to cut the different scantlings from should be supplied.

State what should be the diameter of the small end of logs to produce the following sizes of scantlings:—

- | | |
|-------------|-------------|
| A. 4" × 2" | D. 7" × 2½" |
| B. 5" × 2½" | E. 9" × 3" |
| C. 6" × 2½" | F. 11" × 3" |

State how many cubic feet of round timber are required to produce one thousand superficial feet of boarding three-quarter inch thick.

6. It is proposed to plant 100 acres of land. The greater portion is covered with heather three to five inches in height, part is covered with grass, and part with a strong growth of brackens. It is desired that there should be some variety of foliage when the trees grow up, to improve the view from the Mansion House, which overlooks the area, and also to introduce some of the newer varieties of trees.

State what varieties and sizes of plants you would use—

- A. On the heather-covered area;
- B. On the grass-covered area;
- C. On the bracken-covered area;

giving the system of planting you would adopt for the different sections of land, and also for the different sizes and varieties of plants.

(Three hours allowed.)

FOREST BOTANY AND FOREST ZOOLOGY.

(4) FOREST BOTANY.

(Four questions only to be attempted.)

1. Give an account of the British forest trees belonging to the group Cupuliferæ.

2. Write the life-history of any fungus that causes serious damage in British woodlands.

3. What protections do you meet with in forest trees of temperate regions against excess of transpiration?

4. Describe the mechanisms for dissemination met with in British forest trees.

5. What are the periods of flowering of the native trees of British woods? Show how this period is correlated with that of vegetative activity of each tree.

(B) FOREST ZOOLOGY.

(Two questions only to be attempted.)

1. Write an account of the insect enemies of felled or worked timber.
2. How would you distinguish the larvæ of the Goat Moth (*Cossus ligniperda*); the Pine Sawfly (*Lophyrus pini*); the Large Larch Sawfly (*Nematus Erichsoni*); the Cockchafer (*Melolontha*), and that of a *Pissodes* species?
3. Mention some Scale Insects (*Coccidæ*) that are found on trees, and give the life-history of one of them. What birds eat Scale Insects?

(Two hours allowed.)

PHYSICS, CHEMISTRY, AND METEOROLOGY.

1. What is Boyle's Law? How could you illustrate it experimentally? If a quantity of gas is under atmospheric pressure, and measures 700 cubic feet when the barometer stands at 29.2 inches, what will it measure if the temperature remains constant when the barometer stands at 30.3 inches?
2. What is meant by Specific Gravity? Describe how you would determine the specific gravity of a liquid. A piece of metal weighs 21 grams in air, and 18.4 grams when freely suspended in water. What is its specific gravity?
3. How could you prove that water consists of Hydrogen and Oxygen and has the formula H_2O ? What is meant by hard water? How can hardness be remedied?
4. If ammonia be passed into sulphuric acid, what is formed? 50 c.c. of a solution of sulphuric acid is exactly neutralised by 2 grams of Sodium Carbonate. Find the strength of the acid in grams per litre.
5. What is acetic acid? Mention two methods by which it is prepared. How is it related to alcohol?

C=12, O=16, Na=23, S=32.

(An hour and a half allowed.)

LAND MEASURING, &c.

1. One of the lines of a chain survey crosses a pond. Give two methods of finding the distance across the pond without using any instrument for measuring angles.

2. Draw a rough sketch of a field, and calculate the area in acres, rods, and poles, from the following notes:—

3. Describe the construction of a well-made road suitable for estate work, and give a cross section of such a road of 12 feet width, in a low cutting, having side slopes of $1\frac{1}{2}$ to 1. How are such roads drained?

4. It is desired to make a survey of a small estate extending to about a couple of hundred acres. Describe carefully how you would proceed to set about the work.

5. An embankment has the following dimensions: width at top, 20 feet; at base, 45 feet; height, 11 feet; length at top, 1020 yards; at base, 960 yards. Find its contents in cubic yards.

Links.		
	⊙ B	
	940	
G 100	840	
F 180	610	
	470	210 D
E 200	250	
	180	150 C
	⊙ A	

6. In estimating the quantity of water flowing in a certain stream, it was found that the mean rate of flow was 2·8 miles per hour.

At a cross-section where the stream was 10 feet wide from bank to bank the following measurements were obtained :—

Distance from bank (feet) 0, 1, 2, 4, 6, 8, 9, 10.
Depth of water (inches) 0, 8, 16, 20, 18, 14, 7, 0.

Calculate the amount of water—in cubic feet—passing this point per minute.

7. A saw-mill is to be driven by a portable steam-engine and boiler. Show by sketches how you would arrange the various machines in the saw-mill shed with respect to the engine. What provision would you make for bringing the logs up to the saws, &c.?

Describe the construction of a suitable form of boiler for this kind of work.

(Two hours allowed.)

ARITHMETIC AND BOOK-KEEPING.

1. Divide 153·287345 by 34·163981 by the shortest method you know, bringing out the answer correct to four places of decimals.

2. Find by practice the value of 11 tons, 13 cwt., 2 stones, 12 lb., at 4s. 8d. per cwt.

3. A log of timber is 14 feet long, 21 inches broad, and 10 inches thick. A cubic foot of this wood weighs 32 lb. Find the weight of the log in cwt. and lb.

4. A rectangular piece of land, 300 yards in length by 200 in breadth, is to be planted with young trees in rows 10 feet apart and with a distance of 10 feet between the trees in the same row. The outermost trees are to be 10 feet from the boundaries. How many trees will be required?

5. Without giving figures set down the main heads under which you would classify the annual income and expenditure in connection with the woodlands of an estate on which you were forester.

6. You are forester on the estate of Crofthead. At 1st May 1910 there was due to the estate £500 by Wm. Donaldson and £230 by Evan Thomson, while there was due by the estate £95 to Andrew Black and £73 to Peter White. The balance in bank was £83 and the cash on hand £19. The following were your transactions for the month of May.

1910.

May	3.	Received cheque from Wm. Donaldson and paid into bank	£475
"	"	Allowed him discount	25
"	5.	Drew from bank and paid A. Black	90
"	"	Discount allowed by him	5
"	7.	Sold on credit to Evan Thomson 3000 larch trees	1470
"	8.	Purchased tools on credit from A. Black	23
"	9.	Paid cash to J. Wilson for scouring drains	6
"	10.	Sold on credit to Wm. Donaldson 600 feet of oak at 2s. 6d. per foot	75
"	11.	Received cheque from Evan Thomson and paid into bank	1615
"	"	Allowed him discount	85
"	13.	Paid cash to R. M'Gregor for stationery	2
"	21.	Sold on credit to Evan Thomson 1000 Scots pines	330
"	23.	Bought on credit from Peter White oats for horse	2
"	24.	Received from Wm. Donaldson cash to account	30
"	27.	Paid cash for travelling expenses	3
"	30.	Drew from bank and paid Peter White	72

May 30.	Discount allowed by him	3
" "	Drew from bank and remitted proprietor's agents	500
" "	Drew cash from bank	100
" 31.	Paid estate wages	103

(1) Write up the estate cash-book, keeping separate columns for bank, cash, and discount, and bringing out the balances in bank and on hand at 31st May 1910.

(2) Write up the ledger accounts of the various debtors and creditors, bringing out the amounts due by or to each.

(One hour and a half allowed.)

DAIRY DEPARTMENT

EXAMINATION IN THE SCIENCE AND PRACTICE OF DAIRYING

This Examination, instituted in 1897, is conducted by the National Agricultural Examination Board, appointed jointly by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland.

REGULATIONS.

1. The Societies may hold annually in England and in Scotland, under the management of the National Agricultural Examination Board appointed by them, one or more Examinations for the National Diploma in the Science and Practice of Dairying; the Diploma to be distinguished shortly by the letters "N.D.D."

2. The Examinations will be held on dates and at places from time to time appointed and duly announced.

3. A non-returnable fee of £1 will be required from each candidate.

4. Forms of Entry for the Examination in England may be obtained from "The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.," and must be returned to him duly filled up, with the entry-fee of £1, on or before 15th August.

5. Forms of Entry for the Examination in Scotland may be obtained from "The Secretary, Highland and Agricultural Society of Scotland, 3 George IV. Bridge, Edinburgh," and must be returned to him duly filled up, with the entry-fee of £1, on or before 15th August.

6. A candidate may enter for the Examination either in England or Scotland, but not in both; and a candidate who has once taken part in an Examination in England cannot enter for an Examination in Scotland, or *vice versa*. No candidate may sit for the Examination more than twice.

7. A candidate will be required to satisfy the Examiners, by means of written papers, practical work, and *viva voce*, that he or she has—

(1) A general knowledge of the management of a Dairy Farm, including the rearing and feeding of Dairy Stock, the candidate being required to satisfy the examiners that he or she has had a thorough training and practical experience in all the details of Dairy work as pursued on a farm.

(2) A thorough acquaintance, both practical and scientific, with everything connected with the management of a Dairy, and the manufacture of Butter and Cheese.

(3) Practical skill in Dairying, to be tested by the making of Butter and Cheese.

(4) Capacity for imparting instruction to others.

8. The Board reserve the right to postpone, to abandon, or in any way, or at any time, to modify an Examination, and also to decline at any stage to admit any particular candidate to the Examination.

DATES OF EXAMINATIONS IN 1912.

ENGLAND—SATURDAY, September 14th, and following days, at the University College and British Dairy Institute, Reading; last date for receiving applications, THURSDAY, August 15th.

SCOTLAND—SATURDAY, September 21st, and following days, at the Dairy School for Scotland, Kilmarnock; last date for receiving applications, THURSDAY, August 15th.

SYLLABUS OF SUBJECTS OF EXAMINATION

I.—GENERAL MANAGEMENT OF A DAIRY FARM.

1. *General Management of Pastures and Crops on a Dairy Farm.*

2. *Buildings.*—Situation, Surroundings, Construction, Ventilation, and Drainage of Farm Buildings. Suitability of building materials. Water supply. Construction and arrangements of Dairies: (a) for General Purposes; (b) for Special Purposes.

3. *Foods and Feeding.*—Summer and Winter Feeding of Dairy Cattle. Root crops. Green fodder. Ensilage. Different kinds of food and their composition. Their effect upon Milk, Butter, and Cheese. Special Foods used in Dairy Feeding. Preparation of food for Dairy Stock. Rearing and feeding of young Stock. Feeding and management of Pigs and Poultry.

4. *Dairy Cattle in Health and Disease.*—Characteristics of different Breeds, and choice of Dairy Cattle. General functions of the organs of the animal body. Breeding. Parturition. Organs which secrete milk. Process of milk secretion. Changes which food undergoes during digestion. Diseases of Dairy Cattle and their remedies.

II.—MANAGEMENT OF DAIRY.

1. *Milk and Cream.*—Process of Milking. Dairy Utensils and Appliances, hand and power. Cooling of Milk. Separation and ripening of Cream. Different systems of Cream-raising. Utilisation of Skim-milk. Keeping of Milk. Importance of Cleanliness. Diseases spread by Milk. Conveyance and sale of Milk. Milk records. Keeping of Dairy and Farm Accounts. Creameries. Butter and Cheese Factories. Different systems of Dairying and their comparative returns.

2. *Butter.*—Churns and other Butter-making appliances, hand and power. Souring of Cream. Churning. Washing and working of Butter. Butter-milk. Packing and transmission of Butter. Salting and keeping of Butter. Colouring. Characteristics of good Butter.

3. *Cheese.*—Principles of its manufacture. Making of different kinds of Cheese (from cream, whole-milk, and skim-milk). Acidity of Milk. Use of Rennet and its substitutes. Whey. Appliances for Cheese-making. Ripening and storage of Cheese. Packing and sale of Cheese. Making of Cream and other soft Cheeses.

III.—CHEMISTRY AND BACTERIOLOGY.

[*N.B.*—In this Section there will be expected of the candidate a sound understanding of the scientific principles underlying the practice of Dairying, a knowledge of the composition, nature, properties, and changes undergone by the different substances met with in Dairying, and a general acquaintance with the principles of laboratory methods so far as Dairying is concerned.]

1. *General Principles of Chemistry.*—The nature of elements and compound bodies. The different forms of matter—solid, liquid, gaseous. Specific gravity, and instruments for determining it. Temperature, and methods of measuring it. Thermometric scales. The influence of temperature in Dairy operations. Physical and chemical changes involved in the following: solution, precipitation, filtration, distillation, oxidation, and reduction. Acids, Bases, Salts—their distinctive properties. Acidity and Alkalinity—their influence and quantitative estimation.

The Atmosphere—its constituents and impurities; its influence on Dairy operations. Atmospheric pressure.

Water—constituents of pure and natural waters. The impurities of water, and whence derived. The importance of a pure water-supply in Dairying.

General knowledge of the elementary chemistry of the following substances and their compounds so far as met with in Dairying: Potash, Soda, Ammonia, Lime, Phosphoric Acid, Alcohol, Acetic Acid, Carbonic Acid, Butyric Acid, Lactic Acid, Albumen, Casein, Fats, Milk-sugar, Glycerine, Pepsin.

Saponification of Fats.

2. *Milk and its Products.*—The nature, composition, properties, and chemical constituents of milk. Microscopical appearances presented by milk. The circumstances that affect the quality and quantity of milk produced by the cow. The influence of feeding. The changes which occur in the keeping of milk, and how produced. The natural and artificial souring of milk. Rennet, its nature and use. Physical and chemical changes involved in the making and keeping of Butter, and in the manufacture and ripening of Cheese. Separated Milk, Condensed Milk, Fermented Milk. The use of Preservatives. Methods of Milk-testing—Mechanical methods, their theory and practice. A general knowledge of the methods employed in the chemical analysis of Milk and Butter. Adulteration of Milk, Cream, Butter, and Cheese—the ways in which adulteration is practised, the changes in composition thereby produced, and a general knowledge of the methods employed in detecting the same.

3. *The Chemistry of Feeding.*—The principal constituents of Food materials, and the functions they severally fulfil. The influence of Food constituents on milk production. Assimilation and Digestion. Animal Heat and Respiration. Milk as a Food. The relation of Food to Manure.

4. *Bacteriology.*—Moulds. Yeasts. Bacteria. The principal kinds of Bacteria met with in Dairying—their forms, methods of reproduction, and conditions of life. The influence of physical agencies upon Bacterial life. Air and Water as carriers of Bacteria. The changes produced by Bacteria in milk and its products. Useful forms and their functions. Harmful forms and their effects—Coagulation, Discoloration, Taints, &c. Pathogenic organisms. The classification of organisms—organised ferments and enzymes. Methods of preparation of pure cultures and their practical use. Nutritive media. Pasteurisation and Sterilisation—the practical application of these to Dairy matters. Fermentation and Putrefaction. Disinfectants and Preservatives.

N.B.—Candidates are required to bring their *Laboratory Notes* to the Oral Examination in this subject.

IV.—PRACTICAL SKILL IN DAIRY WORK.

Candidates must be prepared—(1) to produce at or before the Examination a satisfactory certificate of proficiency in the Milking of Cows, signed by a practical Dairy Farmer, and to satisfy the Examiners by a practical test, if so required; (2) to churn and make into Butter a measured quantity of Cream; and (3) to make one Cheese of each of the following varieties: (i) Hard-pressed, of not less than 30 lb.; (ii) Veined or blue-moulded, of not less than 10 lb.; and (iii) also to make one or other of the following Soft Cheeses: Camembert, Coulommier, or Pont l'Évêque.

V.—CAPACITY FOR IMPARTING INSTRUCTION TO OTHERS.

Candidates must also show practically that they are familiar with the management of a Dairy, and are capable of imparting instruction to others.

The following obtained the Diploma in Scotland in 1911 :—

WALTER IAN BLACK, Bogany, Rothesay, Bute.
 BENJAMIN BROWNE, jun., The Boot, Windermere.
 RICHARD BRYDEN, Kingencleugh, Mauchline.
 FRANK E. CORRIE, Griffel House, Doncaster.
 DAVID W. FERGUSON, Cumwhitton, Heads Nook, Carlisle.
 THOMAS R. FERRIS, Market Lavington, Wiltshire.
 SAMUEL GIBSON, Auchengibbert, Crocketford, Dumfries.
 MISS JESSIE GRANT, Wester Alves, Alves.
 ROBERT HALL, Holmbank, Cark-in-Cartmel, Lancs.
 JAMES MCKESSACK LEITCH, Inchstelly, Alves.
 ANDREW C. McCANDLISH, Claunch, Sorbie, Wigtownshire.
 PATRICK W. MACKENZIE, Ardross Mains, Alness.
 MAURICE MALCOLM, Dunmore Farm, by Larbert.
 MISS IRENE MECHAN, 12 Victoria Crescent, Dowanhill, Glasgow.
 DAVID ARNOTT MITCHELL, Bennan, Straiton, Maybole.
 GEORGE N. M. MORRELL, 1 Commercial Street, Harrogate.
 JAMES ROBINSON, Armstrong College, Newcastle-on-Tyne.
 WILLIAM SMITH, Wintersell Farm, Eden Bridge, Kent.
 MISS JESSIE E. STEPHEN, Willaston, Nantwich.
 WILLIAM AIREY YATES, Downham, Clitheroe, Lancs.

The following obtained the Diploma in England in 1911 :—

Miss AGNES WYLIE CRAWFORD, Essex County Technical Laboratories, Chelmsford.
 Miss ALICE LILIAN DEAN, University College and British Dairy Institute, Reading.
 BÉREKET-ZADÉ M. EKREM, University College and British Dairy Institute, Reading.
 VICTOR C. FISHWICK, Agricultural Institute, Ridgmont, Beds., and Midland Agricultural and Dairy College, Kingston, Derby.
 Miss GERTRUDE MARY GARRARD, County Dairy School, Chelmsford.
 Miss GRACE LEWIS, Lancashire C.C. Farm, Hutton, Preston.
 CYRIL HERBERT PAGE, Essex County Technical Laboratories, Chelmsford, Harper-Adams Agricultural College, Newport, Salop, and British Dairy Institute, Reading.
 LAURENCE HAMER PARR, Harper-Adams Agricultural College, Newport, Salop, and Midland Agricultural and Dairy College, Kingston, Derby.

LEWIS H. PYKE, South-Eastern Agricultural College, Wye, Kent, and Midland Agricultural and Dairy College, Kingston, Derby.
 ALFRED ERNEST ROBERTS, Harris Institute, Preston, and Midland Agricultural and Dairy College, Kingston, Derby.
 Miss MARY CHALMERS TAYLOR, Midland Agricultural and Dairy College, Kingston, Derby.
 WILLIAM RICHARD WHITE, University College and British Dairy Institute, Reading.
 Miss MARY J. WILLIAMS, University College of Wales, Aberystwyth, and British Dairy Institute, Reading.
 Miss RACHEL WILLIAMS, University College of Wales, Aberystwyth.
 GORDON BURDASS YOUNG, Harper-Adams Agricultural College, Newport, Salop, and British Dairy Institute, Reading.

EXAMINATION PAPERS OF PAST YEARS.

Copies of the Papers set at the Examinations in 1910 and 1911 may be had on application. Price 6d. per set.

CHEMICAL DEPARTMENT

Chemist to the Society—JAMES HENDRICK, B.Sc., F.I.C., F.C.S.,
 Agricultural Department, Marischal College, Aberdeen.

The object of the Chemical Department is to promote the diffusion of a knowledge of Chemistry as applied to agriculture among the members of the Society, to carry out experiments for that purpose, to assist members who are engaged in making local experiments requiring the direction or services of a chemist, to direct members in regard to the use of manures and feeding-stuffs, to assist them to put the purchase of these substances under proper control, and in general to consider all matters coming under the Society's notice in connection with the Chemistry of Agriculture.

MEMBERS' PRIVILEGES IN RESPECT OF ANALYSES.

The fees of the Chemist for analyses made for members of the Society shall, until further notice, be as follows:—

The estimation of <i>one</i> ingredient in a manure or feeding-stuff,	5s.
The estimation of <i>two</i> or <i>more</i> ingredients in do.	10s.

These charges apply only to analyses made for agricultural purposes, and for the sole and private use of members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed.

Valuations of manures, according to the Society's scale of units, will be supplied if requested.

MISCELLANEOUS.

Analysis of water ¹ to determine purity and fitness for domestic use (not more than one analysis per year for any one member), at reduced fee of	£1 0 0
Analysis of agricultural products—hay, grain, ensilage, roots, &c., ...	1 0 0
Milk, full analysis, ...	0 10 0

¹ Cases containing bottles for water samples and instructions for sampling are sent from the laboratory on application.

Milk, solids and fat, ...	£0 5 0
" fat only, ...	0 2 6
Butter, full analysis, ...	0 10 0
" partial analysis (water and fat), ...	0 5 0
Cheese, ...	0 10 0
Limestone, giving the percentage of lime, ...	0 5 0
Limestone, complete analysis, ...	1 0 0
Lime, including ground lime, percentage of alkaline lime, ...	0 5 0
" " " complete analysis, ...	1 0 0
Analysis of soil, to determine fertility and recommendation of manurial treatment, ...	1 10 0
Complete analysis of soil, ...	2 10 0
Search for poisons in food or viscera, ...	2 0 0
Sulphate of copper, percentage of copper and purity, ...	0 5 0
" " complete analysis, ...	0 10 0
Arsenic, carbolic acid and tar acids, and other poisons used in making sheep dips, &c., ...	5s. to £1

Samples should be sent (carriage paid) to James Hendrick, B.Sc.,
Agricultural Department, Marischal College, Aberdeen.

Note to Members sending Samples for Analysis.

The Directors are anxious to take any steps in their power to expose the vendors of inferior fertilisers and feeding-stuffs, and the members can give them assistance in this by supplying to the chemist, when sending samples for analyses, information as to the guarantee, if any, on which the goods were sold, and also as to the price charged.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

MANURES.

Any method of sampling mutually agreed upon between buyer and seller may be adopted, but the following method is recommended as a very complete and satisfactory one: Four or more bags should be selected for sampling. Each bag is to be emptied out separately on a clean floor, worked through with the spade, and one spadeful taken out and set aside. The four or more spadefuls thus set aside are to be mixed together until a uniform mixture is obtained. Of this mixture one spadeful is to be taken, spread on paper, and still more thoroughly mixed, any lumps which it may contain being broken down with the hand. Of this mixture two samples of about half a pound each should be taken by the purchaser or his agent, in the presence of the seller or his agent or two witnesses (due notice having been given to the seller of the time and place of sampling), and these samples should be taken as quickly as possible, and put into bottles or tin cases to prevent loss of moisture, and having been labelled, should be sealed by the samplers—one or more samples to be retained by the purchaser, and one to be sent to the chemist for analysis.

FEEDING-STUFFS.

Samples of feeding-stuffs which are in the form of meal may be taken in a similar manner.

Samples of cake should be taken by selecting four or more cakes from the bulk. These should be nudded to a size not larger than walnuts. The nudded cake should then be thoroughly mixed and samples of not less than one pound each taken from it. The samples should be put into bottles or tins, sealed up, and labelled. One sample should be sent to the analyst, and one or more duplicates retained by the purchaser.

SOILS.

Dig a little trench about two feet deep, exposing the soil and subsoil. Cut from the side of this trench vertical scrapings of the soil down to the top of the subsoil. Catch these on a clean board, and collect in this manner two pounds of soil taken from the whole surface of the section. Similar scrapings of subsoil immediately below should be taken and preserved separately. Five or six similarly drawn samples at least should be taken from different parts of the field, and kept separate while being sent to the chemist, that he may examine them individually before mixing in the laboratory.

VEGETABLE PRODUCTS.

Turnips, &c., at least 50 bulbs carefully selected as of fair average growth.

Hay, straw, ensilage, &c., should be sampled from a thin section cut across the whole stack or silo, and carefully mixed; above 2 lb. weight is required for analysis.

Grain should be sampled like manures.

DAIRY PRODUCE.

Milk.—Samples of milk from individual cows should be taken direct from the milk-pail after complete milking. Average samples from a number of cows should be taken immediately after milking. Specify whether the sample is morning or evening milk, or a mixture of these. Samples to be tested for adulteration should not be drawn from the bottom or taken from the top of standing milk, but they should be ladled from the vessel after the milk has been thoroughly mixed. Samples of milk should be sent immediately to the analyst.

For most purposes a half-pint bottle of milk is a large enough sample.

Butter and Cheese.—About quarter-pound samples are required.

WATERS.

When the water is from a well, it should be pumped for some minutes before taking the sample.

If the well has been standing unused for a long time, it should be pumped for some hours, so that the water may be renewed as far as possible.

If the well has been newly dug or cleaned out, it should be pumped as dry as possible, daily, for a week before taking the sample.

Water from cisterns, tanks, ponds, &c., should be sampled by immersing the bottle entirely under the water, and holding it, neck upwards, some inches below the surface. *Water from the surface should not be allowed to enter the bottle.*

Spring or stream water should not be sampled in very wet weather, but when the water is in ordinary condition. Such waters should be sampled by immersing the bottle, if possible; but if not deep enough for that purpose, a perfectly clean cup should be used for transferring the water to the bottle.

When the bottle has been filled the stopper should be rinsed in the water before replacing it.

Interference with or disturbance of wells or springs, or the ground in their immediate vicinity, must be carefully avoided during sampling, and for at least twenty-four hours before it.

After a sample has been taken, it should be sent to the laboratory as speedily as possible.

A description of the source and circumstances of the water should accompany the sample, as the interpretation of the analytical results depends to some extent on a knowledge of such particulars.

N.B.—Stone jars and old wine bottles are unsuitable for conveying samples. Winchester quarts chemically cleaned should be obtained from the laboratory, Marischal College, Aberdeen.

LOCAL ANALYTICAL ASSOCIATIONS.

With the view of encouraging, as well as regulating the conduct of, Local Analytical Associations, the Society, from 1881 to 1893, contributed from its funds towards their expenses a sum not exceeding £250 annually. In view of the passing of the Fertilisers and Feeding Stuffs Act, 1893, it was decided, at a meeting of the Directors on the 6th of December 1893, to discontinue that grant after the 1st of March 1894.

COMPOSITION AND CHARACTERISTICS OF MANURES AND FEEDING-STUFFS.

(See '*Transactions, Fifth Series, vol. xi. 1899.*')

FORMS OF GUARANTEE

GUARANTEE OF MANURE.

I guarantee that the manure called.....and sold by me to
.....contains a minimum of—

Soluble phosphoric acid = Phosphate of lime dissolved.....per cent.

Insoluble phosphoric acid = Phosphate of lime undissolved.....per cent.

Potash salts . . . = Potash (K_2O) per cent.

Total nitrogen . . . = Ammonia per cent.

Signature of seller.....

Date.....19...

GUARANTEE OF FEEDING-STUFF.

I guarantee that the feeding-stuff called.....and sold by me to
.....contains a minimum of—

..... per cent albuminoids.

..... per cent oil.

..... per cent carbohydrates.

Signature of seller.....

Date.....19...

UNITS TO BE USED IN DETERMINING THE MARKET PRICE OF MANURES.¹

Terms—CASH, including Bags gross weight—not including Carriage.

N.B.—These units are based on the RETAIL CASH PRICES OF MANURES at Leith and Glasgow. When these units are multiplied by the percentages in the analysis of a Manure, they will produce a value representing very nearly the *cash price* per ton at which TWO TONS may be bought in fine sowable condition at Leith or Glasgow. Larger purchases may be made on more favourable terms, but for smaller purchases an extra charge of 1s. 6d. per ton is made.

FOR SEASON 1912.

CASH PRICES AS FIXED ON 7TH FEBRUARY.

Items to be Valued.	Peruvian (Riddled).		Bone Meal.	Steamed Bone Flour.	Super- phosphates.	
	Nitrogenous.	Phosphatic.			Under 30% Sol.	30% Sol. or over.
	P. unit.	P. unit.	P. unit.	P. unit.	P. unit.	P. unit.
Phosphates dissolved	} 1/4	1/4	..	..	1/10	1/8
" undissolved		1/4	1/7	1/4	..	..
Potash	3/6	3/6	..	..	..	..
Nitrogen	18/6	17/-	14/3	13/6	..	..
Prices per ton—						
From	{ 120/ up- wards	95/ up- wards	130/	95/-	47/6	
To		..	..	135/-	105/-	65/-

MANURES.

At LEITH and GLASGOW.	Guarantee.	Price per Ton.	Unit.
	Per cent.	£ s. d.	
Sulphate of ammonia ²	20 Nitrogen	14 15 0	Nit.=14/9
Nitrate of soda, 95 per cent ²	15.5 "	10 0 0	" =12/11
Muriate of potash, 80 per cent	50 Potash	9 0 0	Pot.=3/7
Sulphate of potash	52 "	10 15 0	" =4/2
Kainit (unpulverised)	12.4 "	2 7 6	" =3/10
Potash salts	30 "	4 15 0	" =3/2
	22 Total phosphate	1 7 6	Phos. Total=1/3
	30 "	1 17 6	" =1/3
	38 "	2 5 0	" =1/2
Basic slag (Thomas - phosphate powder)	17 Citric sol- uble phos- phate	1 7 6	Phos. cit. sol.=1/7½
	26 "	1 17 6	" =1/5
	34 "	2 5 0	" =1/4
Ground mineral phosphate	60 "	2 2 6	" =/8½

NOTE.—This Schedule of Unit Prices of Manures and Feeding-Stuffs is revised each year in the first week of February. Copies of the Schedule may be had by Members any time thereafter.

¹ Instructions regarding units and the valuation of manures are given on p. 36.

² These are the February prices, but they are subject to variation from month to month, or oftener.

FEEDING-STUFFS.				Price per ton at Leith and Glasgow.
	Average Analyses.			
	Album.	Oil.	Carbo- hydrates.	
Linseed-cake	28	10	35	£ s. d. 10 5 0
" Canadian or American	30	8	35	10 0 0
Decorticated cotton-cake	40	9	25	8 0 0
" " Seed-meal	40	9	25	7 15 0
Undecorticated " (Egyptian)	22	5	33	6 5 0
" " (Bombay)	19	4.5	35	5 10 0
Soya-bean cake	42	6	28	8 0 0
Soya-bean meal	38	17	24	9 5 0
Bean-meal, English *	25	1.5	50	8 0 0
Bran, broad	15	4	53	7 5 0
" medium	15	4	55	6 10 0
Wheat parings or sharps	16	4.5	55	7 0 0
Rice-bran, Rangoon	12	13	50	7 5 0
Locust-bean meal	6	1	70	6 5 0
Dried Distillery grains †	20	8	45	6 5 0
" Brewery or malt distillery grains †	20	6	45	6 0 0
Indian corn (American) *	10	5	70	7 0 0
Paisley meal (at Paisley)	15	9	60	7 2 6
Linseed (whole)	22	35	22	20 10 0
Treacle, best grocery	..	..	..	5 2 6

* These are the February prices, but they are subject to variation from month to month, or oftener.

† Bags included.

CLASSIFICATION OF MANURES.

Peruvian guano	{	Guanos with over 4 per cent of nitrogen are to be considered as nitrogenous. Those with less than this percentage are to be classed as phosphatic guano.
Bone-meal	{	Genuine bone-meal contains from 48 per cent to 55 per cent phosphates, and from $3\frac{1}{2}$ per cent to $4\frac{1}{2}$ per cent nitrogen. If phosphates are low, nitrogen will be high, and conversely.
Steamed bone-flour	{	Ground to flour, and containing about 60 to 70 per cent phosphates and about 1 to $1\frac{1}{2}$ per cent nitrogen.
Dissolved bones	{	Must be pure—i.e., containing nothing but bones and sulphuric acid.
Mixtures and compound manures †	{	To be valued according to the following unit prices: nitrogen, 14s. 9d.; soluble phosphate, 1s. 9d.; insoluble phosphate, 1s. 4d.; potash, 3s. 4d.; with an addition of 4s. per ton for bags and 7s. 6d. per ton for mixing. These units give the cash price at Leith and Glasgow. They apply only to mixtures made from high-class materials. For instance, the nitrogen of mixtures valued by these units should not be from shoddy, hair, or leather, or the insoluble phosphates from ground mineral phosphates.
Basic slag (Thomas-phosphate powder)	{	Citric soluble phosphate means phosphate soluble in citric acid in accordance with the official method of Board of Agriculture. Fineness of grinding is of importance. The coarsest kind used should be so finely ground that at least 80 per cent passes through a wire sieve of about 9600 holes per sq. inch.

† Low-grade mixed manures are sometimes sold under names calculated to lead purchasers to believe that they are made from materials of a valuable kind, which are either not present at all or form only a small percentage of the mixture. Purchasers should see that the analysis and the nature of the article correspond with the name.

INSTRUCTIONS FOR VALUING MANURES.

The unit used for the valuation of manures is the hundredth part of a ton, and as the analyses of manures are expressed in parts per hundred, the percentage of any ingredient of a manure when multiplied by the price of the unit of that ingredient represents the value of the quantity of it contained in a ton.

As an example take muriate of potash—a good sample (see p. 34) will be guaranteed to contain 80 per cent *pure* muriate of potash; the other 20 per cent consisting of unimportant impurities, such as common salt. But all potash manures are valued according to the amount of Potash they yield, and 80 per cent of pure muriate of potash yields 50 per cent potash (K_2O)—*i.e.*, 50 units per ton; and as a ton of muriate of potash costs £9, the price of the unit is the fiftieth part of that—*viz.*, 3s. 7d. If on analysis a sample of muriate of potash guaranteed to contain 50 per cent of potash is found to contain only 49 per cent, the price per ton will be 3s. 7d. less—*viz.*, £8, 16s. 6d.

Similarly with all other manures, the price per unit is derived from the price per ton of a sample of good material up to its guarantee, and therefore the proper price per ton of a manure is found by multiplying the price of the unit of the valuable ingredient by the percentage as found by analysis. If a manure contains more than one valuable ingredient, the unit value of each ingredient is multiplied by its percentage, and the values so found when added together give approximately the price per ton of the manure.

Nitrate of soda contains no ammonia, but it contains nitrogen, and 14 units of nitrogen are equivalent to 17 units of ammonia.

The commercial values of manures are determined by means of the UNITS in the following manner:—

Take the analysis of the manure, and look for the following substances:—

Phosphates dissolved (or soluble phosphate)	$\left\{ \begin{array}{l} \text{No other items but these} \\ \text{are to be valued, ex-} \\ \text{cept in the case of} \\ \text{slag, where citric sol-} \\ \text{uble phosphate may} \\ \text{be valued.} \end{array} \right.$
„ undissolved (or insoluble „)	
Nitrogen	
Potash	

Should the analysis or the guarantee not be expressed in that way, the chemist or the seller should be asked to state the quantities in these terms.

Suppose the manure is bone-meal:—

An ordinary bone-meal will contain about 50 per cent phosphate and about $3\frac{1}{2}$ per cent nitrogen. The units for bone-meal are 1s. 7d. for phosphate and 14s. 3d. for nitrogen. Therefore the value is—

Insol. phosphate, 50 times 1s. 7d., equal to	£3 19 2
Nitrogen, $3\frac{1}{2}$ times 14s. 3d., equal to	2 13 5

Say £6 12 7 per ton.

Suppose the manure is a superphosphate,—say an ordinary superphosphate, with 38 per cent soluble phosphate and 2 per cent insoluble phosphate. It is valued thus:—

Sol. phosphate, 38 times 1s. 8d., equal to, say, £3, 3s. 4d. per ton.

Insoluble phosphate is not valued in a superphosphate.

Note.—The units have reference solely to the MARKET PRICE of Manures, and not to their AGRICULTURAL VALUES.

Thus, in stating the phosphate in bone meal at 1s. 6d. per unit, and that in steamed bone flour at 1s. 3d., it is meant that these are the prices per unit at which phosphate can be bought in these two manures; but it does not mean that the phosphate in the one is 3d. per unit better as a manure than that in the other. It is probably no better.

BOTANICAL DEPARTMENT

*Consulting Botanist to the Society—A. N. M'ALPINE,
6 Blythswood Square, Glasgow.*

The Society have fixed the following rates of charge for the examination of plants and seeds for the *bona fide* and individual use and information of members of the Society (not being seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination they require, and to quote its number in the subjoined schedule. The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.

Scale of Charges.

1. A report on the purity, amount, and nature of foreign materials, and the germinating power of a sample of seed, 1s.
2. Determination of the species of any weed or other plant, or of any vegetable parasite, with a report on its habits and the means for its extermination or prevention, 1s.
3. Report on any disease affecting farm crops, 1s.
4. Determination of the species of any natural grass or fodder plant, with a report on its habits and pasture or feeding value, 1s.

The Consulting Botanist's Reports are furnished to enable members—purchasers of seeds and corn for agricultural or horticultural purposes—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes by seedsmen or otherwise.

Purchase of Seeds.

The purchaser should obtain from the vendor, by invoice or other writing, the proper designation of the seed he buys, with a guarantee of the percentage of purity and germination, and of its freedom from ergot, and in the case of clover, from the seeds of dodder or broom-rape.

It is strongly recommended that the purchase of *prepared mixtures* of seeds should be avoided. The different seeds should be purchased separately and mixed by the farmer: mixtures cannot be tested for germination.

The Sampling of Seeds.

The utmost care should be taken to secure a fair and honest sample. This should be drawn from the bulk delivered to the purchaser, and not from the sample sent by the vendor.

When legal evidence is required, the sample should be taken from the bulk, and placed in a sealed bag in the presence of a witness. Care should be taken that the sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or bulk.

At least one ounce of grass and other small seeds should be sent, and two ounces of cereals and the larger seeds. When the bulk is obviously impure the sample should be at least double the amount specified. Grass seeds should be sent at least four weeks, and seeds of clover and cereals two weeks, before they are to be used.

The exact name under which the sample has been sold and purchased should accompany it.

Reporting the Results.

The Report will be made on a schedule in which the nature and amount of impurities will be stated, and the number of days each sample has been under test, with the percentage of the seeds which have germinated.

"Hard" clover seeds, though not germinating within the time stated, will be considered good seeds, and their percentage separately stated.

The impurities in the sample, including the chaff of the species tested, will be specified in the schedule, and only the percentage of the pure seed of that species will be reported upon; but the REAL VALUE of the sample will be stated. The Real Value is the combined percentages of purity and germination, and is obtained by multiplying these percentages and dividing by 100: thus in a sample of Meadow Fescue having 88 per cent purity and 95 per cent germination, 88 multiplied by 95 gives 8360, and this divided by 100 gives 83·6, the Real Value.

Selecting Specimens of Plants.

The whole plant should be taken up and the earth shaken from the roots. If possible the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

Parcels or letters containing seeds or plants for examination (carriage or postage paid) must be addressed to Professor M'Alpine, Botanical Laboratory, 6 Blythswood Square, Glasgow.

ENTOMOLOGICAL DEPARTMENT

Consulting Entomologist to the Society—Dr R. STEWART MACDOUGALL,
9 Dryden Place, Edinburgh.

Arrangements have been made with Mr R. Stewart MacDougall, M.A., D.Sc., Edinburgh, to advise members of the Society regarding insects or allied animals which, in any stage of their development, infest—

- | | |
|-----------------------------------|-------------------------------------|
| (a) Farm crops. | (d) Fruit and fruit trees. |
| (b) Stored grain. | (e) Forest trees and stored timber |
| (c) Garden and greenhouse plants. | (f) Live stock (including poultry). |

Members consulting Dr MacDougall will please forward with their queries examples of the injured plants, or the injured parts of plants, &c., as well as specimens of the insects or other animals believed to be the cause of the injury.

Specimens should be sent in tin or wooden boxes, or in quills, to prevent injury in transmission.

Address letters and parcels (carriage or postage paid) to Dr R. Stewart MacDougall, 9 Dryden Place, Edinburgh.

The Directors have fixed the fee payable by members to Dr MacDougall at 1s. for each case upon which he is consulted: this fee must be sent to him along with the application for information.

PREMIUMS

GENERAL REGULATIONS FOR COMPETITORS.

1. It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the writers whose papers are published in the 'Transactions.'

2. All reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter, similarly marked, containing the name and address of the reporter—initials must not be used.

3. No sealed letter, unless belonging to a report found entitled to the Premium offered, or a portion of it, will be opened without the author's consent.

4. Reports for which a Premium, or a portion of a Premium, has been awarded, become the property of the Society, and cannot be published in whole or in part, nor circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors if applied for within twelve months.

5. The Society is not bound to award the whole or any part of a Premium.

6. All reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded or accepted. Weights and measurements must be indicated by the imperial standards.

7. The Directors, before or after awarding a Premium, shall have power to require the writer of any report to verify the statements made in it.

8. The decisions of the Board of Directors are final and conclusive as to all matters relating to Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

9. The Directors will welcome papers from any Contributor on any suitable subject, whether included in the Premium List or not; and if the topic and the treatment of it are both approved, the writer may be remunerated and his paper published.

CLASS I.

REPORTS.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

2. Approved Reports on other suitable subjects. To be lodged by 1st November in any year.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive Improvement—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Minor Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the Reporter's proprietorship.

2. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty acres of Waste Land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

3. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of Waste Land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

4. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold

Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The Reports in competition for Nos. 2, 3, and 4 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of profitable character, and a rotation of crops must have been concluded before the date of the Report. *A detailed statement of the expenditure and return and a certified measurement of the ground are requisite.*

5. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the Pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise, without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

6. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos. 5 and 6 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—HIGHLAND INDUSTRIES AND FISHERIES.

FOR APPROVED REPORTS.

1. The best mode of treating native Wool; cleaning, carding, dyeing, spinning, knitting, and weaving by hand in the Highlands and Islands of Scotland—Five Sovereigns. To be lodged by 1st November in any year.

SECTION 4.—MACHINERY.

FOR APPROVED REPORTS.

To be lodged by 1st November in any year.

SECTION 5.—FORESTRY DEPARTMENT.

FOR APPROVED REPORTS.

1. On Plantations of not less than eight years' standing formed on deep peat-bog—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

CLASS II.

DISTRICT COMPETITIONS.

REGULATIONS 1912.

Grants in aid of DISTRICT COMPETITIONS for 1913 must be applied for before 1st November 1912, on Forms to be obtained from the Secretary.

When a Money Grant has expired, the District cannot apply again for another Money Grant for four years.

SECTION I.—GRANTS TO DISTRICT SOCIETIES FOR HORSES, CATTLE, SHEEP, AND PIGS.

1. CLASS OF STOCK—LIMIT OF GRANTS, £340.—The Highland and Agricultural Society will make Grants to District Societies for prizes for *Breeding Animals* of any of the following Classes of Stock, viz. :—

Cattle.

Shorthorn.
Aberdeen-Angus.
Galloway.
Highland.
Ayrshire.
Jersey.

Sheep.

Blackface.
Cheviot.
Border Leicester.
Half-Bred.
Shropshire.
Oxford-Down.
Suffolk.
Wensleydale.

Horses.

Draught Horses.
Hunters.
Hackneys.
Ponies.
Shetland Ponies.

Swine.

Any Pure Breed.

Cross-bred animals are not eligible. The Prizes must be confined to *Breeding Animals*; “bullocks,” “geldings,” “wethers,” and “hog pigs” are excluded.

2. All Competitions must be at the instance of a local Society. A Committee of Management shall be appointed, and the Convener of the Committee must be a Member of the Highland and Agricultural Society.

3. GRANT TO DISTRICT, £12.—The portion of the Grant to any one District Society shall not exceed the sum of £12 in any one year.

4. ALLOCATION OF GRANT.—The Grant from the Highland and Agricultural Society is not to be applied as a Grant in aid of the Premiums offered by the Local Society, but must be offered in the form of separate Prizes for the Animals chosen; and the Prizes must be announced in the Premium List and Catalogue of the Show as “given by the Highland and Agricultural Society.”

5. CONTINUANCE OF GRANT THREE YEARS.—The Money Grant shall continue for three alternate years, provided always that the District Society

shall, in the two intermediate years, continue the competition by offering Premiums for the same class of Stock as that selected in each previous year to compete for the Highland and Agricultural Society's Prizes. If no competition takes place for two years the Grant expires.

6. When it is agreed to hold the General Show of the Society in any district, no provincial show shall be held in that district in the months of June, July, or August.

7. MEDALS IN INTERMEDIATE YEARS.—In the two alternate years the Highland and Agricultural Society will place three Silver Medals at the disposal of the District Societies, for the same classes of Stock as those for which the Money Premiums are offered, provided that not less than three lots are exhibited in the same class.

8. RULES OF COMPETITION.—The Rules of Competition for the Premiums, the Funds for which are derived from Grants of the Highland and Agricultural Society, shall be such as are generally enforced by the Society receiving the Grant for Premiums offered by itself.

9. AREA AND PARISHES—FIVE PARISHES.—When making application for Grants from the Highland and Agricultural Society, the District Society must delineate the area and the number of parishes comprised in the district, and, *except in special cases*, no District Society shall be entitled to a Grant whose show is not open to at least five Parishes.

10. REPORTS.—Blank Forms for Reports will be furnished to the Secretaries of the different District Societies. Both in the years when the Grant is offered and in the two intermediate years, detailed reports of the competition must be given on these Forms and lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Show, and in no case later than 1st November. These reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. All Reports must be signed and certified as marked in the Form.

11. GRANTS—WHEN PAID.—The Grants made to District Societies will be paid in December after the Reports of the awards of the prizes have been received and found to be in order and passed by the Board of Directors, the Money Grants being paid to the Secretaries of the Local Societies and the Medals sent direct to the winners. *The Secretary of the District Society must not on any condition whatever pay any premium offered by the Highland and Agricultural Society until he has been informed that the awards are in order and has received the Grant from the Highland and Agricultural Society.*

12. RENEWAL OF APPLICATION.—No application for renewal of a Money Grant to a District Society will be entertained until the expiration of *four* years from the termination of the last Grant.

13. DISPOSAL OF APPLICATIONS.—In disposing of applications for District Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those District Societies which have been longest off the list.

DISTRICTS.

1. MAR.—*Convener*, Charles Rennie, West Fintray, Kintore; *Secretary*, Neil Smith, Blackburn, Kinellar. Granted 1907. (In abeyance in 1908 on account of the Aberdeen Show.)
2. NEW CUMNOCK.—*Convener*, Adam Mackie, Hall of Auchincross, New Cumnock; *Secretary and Treasurer*, George Scott, New Cumnock. Granted 1908.

3. EDINBURGH AGRICULTURAL ASSOCIATION.—*President*, The Earl of Rosebery, K.G., Dalmeny Park, Edinburgh; *Secretary*, James Wylie, Royal Bank, Leith. Granted 1908.
4. BATHGATE.—*Convener*, William White, Royal Hotel, Bathgate; *Secretary*, A. Macleod Sinclair, 47 Hopetoun Street, Bathgate. Granted 1908.
5. NITHSDALE.—*Convener*, William Barber of Terreran, Moniaive; *Secretary*, David Paterson, Solicitor, Thornhill. Granted 1909. (In abeyance in 1910 on account of the Dumfries Show.)
6. ST MARY'S ISLE ESTATES AND DISTRICT.—*Convener*, John Wilkinson, The Grange, Kirkcudbright; *Secretary*, John Gibson, Solicitor, Kirkcudbright. Granted 1909. (In abeyance in 1910 on account of the Dumfries Show.)
7. WIGTOWN.—*Convener*, A. B. Matthews, Newton-Stewart; *Secretary*, Gavin Coupland, Hope Cottage, Wigtown. Granted 1909. (In abeyance in 1910 on account of the Dumfries Show.)
8. STRATHSPEY.—*Convener*, J. Grant Smith, Strathspey Estate Office, Grantown-on-Spey; *Secretary*, John Mackintosh, Solicitor, Grantown-on-Spey. Granted 1909. (In abeyance in 1911 on account of the Inverness Show.)
9. WESTER ROSS.—*Convener*, William Stirling, Fairburn, Muir of Ord; *Secretary*, James Cumming, County Buildings, Dingwall. Granted 1909. (In abeyance in 1911 on account of the Inverness Show.)
10. BUCHAN.—*President*, Lieut.-Colonel Ferguson of Pitfour, Mintlaw; *Secretary*, James A. Smith, Bank House, Strichen. Granted 1910.
11. INVERURIE.—*Convener*, John Philip, Lofthillock, Keith Hall, Inverurie; *Secretary*, John Strachan, 9 Albert Street, Inverurie. Granted 1910.
12. GIRVAN.—*Convener*, William Bone, Shalloch Park, Girvan; *Secretary*, Andrew Dunlop, Royal Bank, Girvan. Granted 1910.
13. STIRLING.—*Convener*, Thos. L. Reid, Royal Bank, Stirling; *Secretary*, Andrew C. Buchanan, 26 Port Street, Stirling. Granted 1910.
14. STRATHBOGIE.—*Convener*, John Simpson, Slich, Drumblade, Huntly; *Secretary*, Wm. M. Morrison, Cairnie, Huntly. Granted 1912.
15. ISLAY, JURA, AND COLONSAY.—*Convener*, James Forbes, Eallabus, Bridgend, Islay; *Secretary*, Robert Cullen, Bridgend, Islay. Granted 1912.
16. CASTLE DOUGLAS.—*Convener*, E. A. Phillips of Dildawn, Castle Douglas; *Secretary*, Patrick Gifford, 118 King Street, Castle Douglas. Granted 1912.
17. DOUNE.—*Convener*, John Scrimgeour, Doune Lodge, Doune; *Secretary*, William Gray, Doune. Granted 1912.
18. EASTERN DISTRICT OF STIRLINGSHIRE AGRICULTURAL SOCIETY.—*Convener*, William Neilson, Haining Valley, Linlithgow; *Secretary*, Robert Waugh, Newmarket Street, Falkirk. Granted 1912.
19. MONKTON, NEWTON, PRESTWICK, AND ST QUIVOX.—*Convener*, Thos. C. Lindsay, Aitkenbrae, Monkton; *Secretary*, Hugh Boyd, jun., 57 Main Street, Prestwick. Granted 1908. (In abeyance in 1909. No competition.)
20. CAMPSIE, STRATHBLANE, AND BALDERNOCK.—*Convener*, D. Y. Stewart, Carse of Trowan, Crieff; *Secretary*, Donald Ferguson, Dunlop Place, Lennoxtown. Granted 1908. (In abeyance in 1909 on account of the Stirling Show.)
21. SUTHERLAND.—*Convener*, John Risk, Clynelish, Brora; *Secretary*, Peter Stuart, Clynelish, Brora. Granted 1908. (In abeyance in 1911 on account of the Inverness Show.)

22. **ESKDALE AND LIDDESDALE.**—*Convener*, Thomas Gaskell, Murtholm, Langholm; *Secretary*, Alexander Thomson, British Linen Bank, Langholm. Granted 1908. (In abeyance in 1910 on account of the Dumfries Show.)
23. **STRANRAER AND RHINS OF GALLOWAY.**—*Convener*, James M'Clean, Auchneel, Stranraer; *Secretary*, Percy John Adair, Solicitor, Stranraer. Granted 1908. (In abeyance in 1910 on account of the Dumfries Show.)
24. **EAST KILBRIDE.**—*Convener*, John Hamilton, Low Mains, East Kilbride; *Secretary*, William Strang, 24 George Square, Glasgow. Granted 1909.
25. **LOWER WARD OF RENFREWSHIRE.**—*Convener*, Sir Hugh Shaw Stewart, Bart., Ardgowan, Greenock; *Secretary*, A. Douglas Murray, 2 Church Place, Greenock. Granted 1909.
26. **BUTE.**—*Convener*, Colin M'Callum, Kilmichael, Bute; *Secretary*, James Fisher, 5 King Street, Rothesay. Granted 1909.
27. **ARGYLL.**—*Convener*, Captain John Campbell of Kilberry; *Secretary*, James M'Dougall, South Cliff, Tarbert, Lochfyne. Granted 1910. (In abeyance in 1910—unable to hold a show.)
28. **LARGS, CUMBRAE, AND WEMYSS BAY.**—*Convener*, J. W. Crawford, Kilburn, Largs; *Secretary*, Neil Mitchell, 1 Gallowgate Square, Largs. Granted 1911.
29. **CLACKMANNANSHIRE UNION.**—*Convener*, Donald A. Kinross, Hillend, Clackmannan; *Secretary*, Alex. L. Roxburgh, Solicitor, Alloa. Granted 1911.
30. **MOFFAT AND UPPER ANNANDALE.**—*Convener*, Wm. R. Carruthers, Stenrieshill, Wamphray, by Beattock; *Secretaries*, James Johnstone, Solicitor, Moffat, and John Young, High Street, Moffat. Granted 1911.
31. **UNITED EAST LOTHIAN.**—*Convener*, Thomas Elder, Stevenson Mains, Haddington; *Secretary*, John Stirling, Solicitor, Haddington. Granted 1911.
32. **GLENKENS.**—*Convener*, J. M. Kennedy, Knocknalling, Dalry; *Secretary*, James M'Gill, High Street, New Galloway. Granted 1911.
33. **STRATHENDRICK.**—*Convener and Secretary*, W. Watson Murray, Catter House, Drymen. Granted 1911.

In 1912.

Nos. 1, 2, 3, and 4 are in competition for the last year.

Nos. 5, 6, 7, 8, 9, 10, 11, 12, and 13 are in competition for the second year.

Nos. 14, 15, 16, 17, and 18 are in competition for the first year.

Nos. 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, and 33 compete for local Premiums. (See Rule 7.)

**SECTION 2.—GRANTS TO HORSE ASSOCIATIONS, &c., FOR
STALLIONS FOR AGRICULTURAL PURPOSES.**

1. The Highland and Agricultural Society will make Grants to Horse Associations and other Societies in different districts engaging Stallions for agricultural purposes. The total sum expended by the Highland and Agricultural Society in such Grants shall not exceed the sum of £210 in any one year.

2. The portion of the Grant to any one Association or Society shall not exceed the sum of £15 in any one year.

3. The Grant will be available only for Stallions which, for the year to which the Grant applies, are Registered in the Register of Certified Draught Stallions published by the Board of Agriculture. (For information regarding the Registration of Stallions, apply to the Secretary of the Board of Agriculture, 4 Whitehall Place, London, S.W.)

4. The Grant will continue for three years provided the Association receiving the Grant shall hire a Registered Stallion in the two intermediate years.

5. In the event of a Horse not being engaged in any one year while the provisions of the Grant are in force, the Grant made by the Highland and Agricultural Society will cease.

6. RULES 2 (Committee and Convener), 10 (Reports), 11 (Time of Payment), 12 (Renewal of Grant), and 13 (Disposal of Applications) applicable to Section 1, shall be applicable to this Section.

DISTRICTS.

1. LAUDERDALE.—*Convener*, R. Dickinson, Longcroft, Lauder ; *Secretary*, George L. Broomfield, Lauder. Granted 1908.
2. KIRRIEMUIR.—*Convener*, John Duncan, Muirhouses, Kirriemuir ; *Secretary*, Stewart Lindsay, Crawford House, Kirriemuir. Granted 1908.
3. HOWE OF THE MEARNS.—*Convener*, James Alexander, Bent, Laurencekirk ; *Secretary*, G. T. Brown, Cairnbeg, Fordoun. Granted 1908.
4. GLENKENS AND DISTRICT.—*Convener*, John Young of Brockloch, Dalbeattie ; *Secretary*, Robert T. Scott, Drumh Humphrey, Corsock, Dalbeattie. Granted 1908.
5. ORKNEY.—*Convener*, James Johnston of Coubister, Orphir, Orkney ; *Secretary*, Robt. Scarth, Binscarth, Finstown, Orkney. Granted 1908.
6. DUNBLANE, DOUNE, AND CALLANDER.—*Convener*, James Paterson, Burnbank, Blair-Drummond ; *Secretary*, W. D. M'Laren, Drummore, Doune. Granted 1910.
7. STIRLING.—*Convener*, James Rodger, Keir Mains, Dunblane ; *Secretary*, Robert Paterson, Hill of Drip, Stirling. Granted 1910.
8. WEST OF FIFE.—*Convener*, R. Jeffrey, Drumfin, Torryburn, Inverkeithing ; *Secretary*, James Millar, Waulkmill, Charleston. Granted 1910.
9. DUMBARTONSHIRE.—*Convener*, William Stewart, Milton Farm, Duntocher ; *Secretary*, William Davie, 253 Main Street, Alexandria. Granted 1912.
10. KINROSS-SHIRE.—*Convener*, William Tod, East Brackley, Kinross ; *Secretary*, John A. Hepburn, M.R.C.V.S., Ordmohr, Milnathort. Granted 1912.
11. LOWER WARD OF RENFREWSHIRE.—*Convener*, John Scott, Barr Farm, Skelmorlie ; *Secretary*, James Mathie, Coves Farm, Gourpck. Granted 1912.
12. AIRD AND STRATHGLASS.—*Convener*, Alexander M'Donell, Dunballoch, Beaully ; *Secretary*, Simon Fraser, Moniack, Kirkhill. Granted 1912.
13. FYVIE.—*Convener*, James Durno, Jackstown, Rothienorman, Fyvie ; *Secretary*, John Ferguson, Westertown, Rothienorman. Granted 1909.
14. TURRIFF.—*Convener*, Alexander Reid, Balgreen, Turriff ; *Secretary*, R. Cruickshank, Claymires, Turriff. Granted 1909.

15. **POLTALLOCH.**—*Convener*, Robert Crawford, Upper Largie, Kilmartin; *Secretary*, Archd. Taylor, Ricruin, Lochgilphead. Granted 1909.
16. **NAIRNSHIRE.**—*Convener*, Donald A. Stewart, Lochdhu, Nairn; *Secretary*, Archd. J. Mackintosh, St Colms, Auldearn, Nairn. Granted 1909.
17. **VALE OF ALFORD.**—*Convener*, W. A. Mitchell, Auchnagathle, Keig; *Secretary*, John Reid, Donbank, Alford. Granted 1911.
18. **LOCKERBIE.**—*Convener*, John M. Aitken, Norwood, Lockerbie; *Secretary*, J. R. Byres, Royal Bank Buildings, Lockerbie. Granted 1911.
19. **PERTH AND COUPAR-ANGUS.**—*Convener*, W. S. Ferguson, Pictstonhill, Perth; *Secretary*, James Stewart, Friarton, Perth. Granted 1911.
20. **NEWTON-STEWART.**—*Convener*, Alex. Cumming, Stonehouse, Sorbie; *Secretary*, John M'Conchie, Carsewilloch, Creetown. Granted 1911.

In 1912.

Nos. 1, 2, 3, 4, and 5 are in competition for the last year.

Nos. 6, 7, and 8 are in competition for the second year.

Nos. 9, 10, 11, and 12 are in competition for the first year.

Nos. 13, 14, 15, 16, 17, 18, 19, and 20 compete for local premiums.

SPECIAL GRANTS.

- £40 to the Highland Home Industries Association.—*Secretary*, Miss Jessie D. C. Ross, Riverfield, Inverness. Granted 1895. (Did not hold a competition in 1899, 1900, or 1908.)
- £20 to the Ayrshire Agricultural Association, to be competed for at the Dairy Produce Show at Kilmarnock.—*Convener*, James Middleton, Estate Office, Braehead, Kilmarnock; *Secretary*, John Howie, 58 Alloway Street, Ayr. Granted 1872.
- £25 to Shetland Agricultural Society.—*Convener*, J. M. Goudie, Lerwick; *Secretary*, James J. Brown, Lerwick. Granted 1893.
- £5 to Ross-shire Crofters' Show.—*Convener*, T. W. Cuthbert, Achindunie, Alness; *Secretary*, Hector Ross, Banker, Alness. Granted 1910 for 3 alternate years, and 2 Silver Medals in the 2 intermediate years, which may be awarded to animals of any pure breed or cross. Granted 1912.
- £3 to Orkney.—*Convener*, James Johnston, Orphir House, Orphir, Orkney; *Secretary*, D. B. Peace, jun., Auctioneer, Kirkwall. Granted 1883. (In abeyance 1912.)
- £3 to East Mainland, Orkney.—*Convener and Secretary*, John Clouston, Graemeshall, Holm, by Kirkwall. Granted 1898. (In abeyance 1912.)
- £3 to West Mainland, Orkney.—*Convener*, W. G. T. Watt, Skail House, Stromness; *Secretary*, J. M. H. Robertson, Lyking, Sandwick, Orkney. Granted 1900.
- £3 to Sanday, Orkney.—*Convener*, W. Cowper Ward, Scar House, Sanday, Orkney; *Secretary*, K. H. Sinclair, Kettletoft, Sanday, Orkney. Granted 1902. (In abeyance 1912.)
- £3 to Rousay, Orkney.—*Convener*, H. H. Horne, Trumland Farm, Rousay, Orkney; *Secretary*, Allan Gibson, Myres, Sourin, Rousay. Granted 1903.
- £3 to Gigha Agricultural Society.—*Convener*, W. J. Yorke Scarlett, of Gigha; *Secretary*, W. W. Philip, Estate Office, Gigha. Granted 1909 for 3 alternate years. (In abeyance 1912.)

- £3 to Walls and Hoy.—*Convener*, Anderson Sutherland, Manclet, Brims, Walls, Orkney; *Secretary*, William Marwick, Melsetter, Orkney. Granted 1909 for 3 alternate years. (In abeyance 1912.)
- £3 to South Ronaldshay and Burray, Orkney.—*Convener*, Arch. Allan, St Margaret's Hope, Orkney; *Joint-Secretaries*, William Cromarty, Widewall House, and Robert Cromarty, Sandwick House, St Margaret's Hope, Orkney. Granted 1904.
- £3 to Unst, Shetland.—*Convener*, Alexander M. Sandison, Moundeville, Uyeasound, Shetland; *Secretary*, Mountford A. White, Belmont, Unst. Granted 1911 for 3 alternate years. (In abeyance 1912.)
- The British Dairymaids' Association.—*Convener*, J. H. R. Turnbull, 7 W. Maitland Street, Edinburgh; *Secretary*, Miss J. Barbour, N.D.D., Levenhall, Musselburgh. 1 Minor Gold Medal and 1 Medium Silver Medal for Champion Butter-making Competitions. Granted 1908.
- Glasgow and West of Scotland Horticultural Society.—*Secretary*, Hugh M. Mackie, C.A., 124 St Vincent Street, Glasgow. Special Grant of 6 Medium Silver Medals to be competed for at Centenary Show to be held in Glasgow, 1912.

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

The Society, being anxious to co-operate with local Associations, will give a limited number of Silver Medals annually to Societies, not on the list of Cattle, Horse, or Sheep Premiums, in addition to the Money Premiums awarded in the Districts, for—

1. Best Bull, Cow, or Heifer of any pure breed included in Section 1.
2. Best Stallion, or Mare of any pure breed included in Section 1.
3. Best Tup, or Pen of Ewes of any pure breed included in Section 1.
4. Best Boar, Sow, or Breeding-Pig of any pure breed.
5. Best Pens of Poultry.
6. Best Sample of any variety of Wool.
7. Best Sample of any variety of Seeds.
8. Best managed Farm.
9. Best managed Green Crop.
10. Best managed Hay Crop.
11. Best managed Dairy.
12. Best Sweet-Milk Cheese.
13. Best Cured Butter.
14. Best Fresh Butter.
15. Best collection of Roots.
16. Best kept Fences.
17. Male Farm Servant who has been longest in the same service, and who has proved himself most efficient in his duties, and to have invariably treated the animals under his charge with kindness.
18. Female Servant in charge of Dairy and Poultry who has been longest in the same service, and who has proved herself most efficient in her duties, and to have invariably treated the animals under her charge with kindness.
19. Best Sheep-Shearer.
20. Most expert Hedge-Cutter.
21. Most expert Labourer at Draining.
22. Best Maker of Oat-Cakes.

It is left to the local Society to choose out of the foregoing list the classes for which the Medals are to be competed.

The Medals are granted for two years, and lapse if not awarded in those years.

No Society shall receive more than two Medals for two years.

Aberdeenshire.

1. UPPER DONSIDER.—*Convener*, William D. Ellis, Kinlune, Glenkindie ; *Secretary*, John Milne, Honeyburrel, Kildrummy, Mossat. 2 Medals. 1911.

Argyllshire.

2. TIREE.—*Convener*, H. Macdiarmid, Island House, Tiree ; *Secretary*, Robert Barr, Balephotrich, Tiree. 2 Medals. 1912.

Ayrshire.

3. ARDROSSAN AND WEST KILBRIDE.—*Convener*, Dugald McKinnon, Stanley, West Kilbride ; *Secretary*, William Gray, Solicitor, Ardrossan. 2 Medals. 1911.
4. BEITH.—*Convener*, David Kerr, Marshalland, Keith ; *Secretary*, Matthew Gilmour, Clydesdale Bank, Beith. 2 Medals. 1911.

Elginshire.

5. FORRES AND NORTHERN.—*Convener*, John Mavor, Earnside, Forres ; *Secretary*, Alexander Dunbar, Solicitor, Forres. 2 Medals. 1912.

Fifeshire.

6. STRATHMIGLO.—*Convener*, R. D. Thom of Pitlochrie, Gateside ; *Secretary*, Alex. Reekie, High Street, Strathmiglo. 2 Medals. 1911.
7. WESTERN DISTRICT OF FIFE.—*Convener*, Hugh Brown, Cotton Mains, Dunfermline ; *Secretary*, Robert Husband, 1 Douglas Street, Dunfermline. 2 Medals. 1911.

Inverness-shire.

8. LOCHABER.—*Convener*, R. Everard Jones, Fassfern, Kinlochiel, R.S.O. ; *Secretaries*, Wm. E. Jones, Fassfern, Kinlochiel, R.S.O., and N. B. Mackenzie, jun., Fort William. 2 Medals. 1910. (In abeyance 1911.)
9. NORTH UIST.—*Convener*, Dr M. T. Mackenzie, Scolpaig, N. Uist ; *Secretary*, H. H. Mackenzie, Balelone, Lochmaddy. 2 Medals. Granted 1910 for three years.

Kincardineshire.

10. KINCARDINESHIRE.—*Convener*, Alexander Dewar, Factor, Fasque, Fettercairn ; *Secretary*, James B. Connon, Solicitor, Stonehaven. 2 Medals. 1912.

Kirkcudbrightshire.

11. CARSPHAIERN.—*Convener and Secretary*, Charles E. Stewart, Carsphairn, Dalry, Kirkcudbrightshire. 2 Medals. 1912.

12. DALBEATTIE.—*Convener*, Wellwood Maxwell of Kirkennan, Dalbeattie; *Secretary*, J. E. Milligan, Solicitor, Dalbeattie. 2 Medals. 1912.
13. GALLOWAY.—*Convener*, Sir Mark J. M'Taggart Stewart, Bart., Ardwell, Wigtownshire; *Secretary*, Patrick Gifford, Solicitor, Castle Douglas. 2 Medals. 1912.

Lanarkshire.

14. CARNWATH.—*Convener*, William Muir, Townhead, Libberton, Carnwath; *Secretary*, William Paxton, Carnwath. 2 Medals. 1911.
15. CHAPELTON DISTRICT.—*Convener*, Thomas Nelson, Laigh Knoweglass, East Kilbride; *Secretary*, John G. Duncan, Schoolhouse, Chapelton, by Hamilton. 2 Medals. 1912.
16. DOUGLAS.—*Convener*, J. P. Baird, Castlemains, Douglas; *Secretary*, William Davidson, Gateside, Douglas. 2 Medals. 1912.
17. SHOTTS CALDERWATERHEAD.—*Convener*, John Weir, Shottsburn Farm, Salsburgh, Holytown; *Secretary*, Alexander Waddell, 49 Wesleyan Street, Glasgow. 2 Medals. 1912.

Perthshire.

18. ARDOCH.—*Convener*, Robert Pullar, Rottearns, Braco; *Secretary*, John Maxton, Rhynd, Braco. 2 Medals. 1912.
19. ROSSIE PRIORY AND DISTRICT.—*Convener*, Thomas A. Hollingworth, Newmains, Inchtute; *Secretary*, John E. Murray, Balruddery, Dundee. 2 Medals. 1911.

Applications from other Districts must be lodged with the Secretary of the Society by 1st November next.

RULES OF COMPETITION.

1. All Competitions must be at the instance of a local Society.
2. The classes for which Medals are granted must be in accordance with the list at page 48. The Committee shall select the classes, and specify them in the Report.
3. A Committee of Management shall be appointed, and the Convener of the Committee must be a Member of the Highland and Agricultural Society.
4. The Money Premiums given in the District must be not less than £2 for each Medal claimed.
5. The Medal for Sheep-Shearing shall always accompany the highest Money Premium.
6. There must not be fewer than three competitors in all the classes.
7. Regarding Reports, despatch of Medals, and application for renewal of Grant, Rules 10 and 11, Section I., will apply.
8. When a grant of Medals has expired, the District cannot apply again for Medals for two years.

PLOWING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first Premium at Ploughing Competitions, provided a Report in the following terms is made to the Secretary, within one month of the Competition, by a Member of the Society. Forms of Report to be had on application:—

FORM OF REPORT.

I, _____ of _____, Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the _____ Association at _____ in the county of _____ on the _____ when _____ ploughs competed; _____ of land were assigned to each, and _____ hours were allowed for the execution of the work. The sum of £ _____ was awarded in the following proportions, viz. :—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All Matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society, 3 George IV. Bridge, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can only report one Match; and a Ploughman cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal there must have been twelve ploughs in Competition, and not less than Three Pounds awarded in Prizes by the local Society. The Medal to be given to the winner of the first prize.

7. The Local Committee or Society may, if they desire, arrange to let each ploughman have one person to guide the horses for the first two and the last two furrows, but in no case shall ploughmen receive any other assistance, and their work must not be set up nor touched by others. Attention should be given to the firmness and sufficiency of the work below more than to its neatness above the surface.

8. The Local Committee is required to fix the time to be allowed for ploughing the portion of land, and they are recommended that the time be at the rate of not more than ten hours per imperial acre on light land, and fourteen hours on heavy or stony land.

CLASS III.

COTTAGES AND GARDENS.

The following Premiums are offered for Competition in the Parishes after mentioned.

The Premiums are granted for two years.

PREMIUMS FOR BEST KEPT COTTAGES AND GARDENS.

1. Best kept Cottage	.	.	.	.	.	£1	0	0
Second best	.	.	.	.	.	0	10	0
2. Best kept Cottage Garden	.	.	.	.	.	1	0	0
Second best	.	.	.	.	.	0	10	0

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Lodges at Gentlemen's Approach Gates and Gardeners' Houses are excluded, as well as others whom the Committee consider, from their position, not to be entitled to compete. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. It is left to the Committee of the District to regulate the maximum annual rent of the Cottages, which may, with the garden, be from £5 to £7.

4. To warrant the award of full Premiums, there must not be fewer than three competitors in each class. If there are less than three competitors in each class, only half Premium will be awarded.

5. A person who has gained the highest Premium cannot compete again.

6. If the Cottage is occupied by the proprietor, the roof must be in good repair; if the roof is thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly; the windows must be free of broken glass, clean, and affording the means of ventilation. Dunghills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

7. In estimating the claims for the Garden Premiums, the judges should have in view—the sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

8. Reports, stating the number of Competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be lodged with the Secretary of the Highland and Agricultural Society *on or before the 1st November next*.

9. When a grant of Money has expired, the District cannot apply again for aid for four years.

Parishes desirous of these Premiums must lodge applications with the Secretary *on or before the 1st November next*.

MEDALS FOR COTTAGES AND GARDENS OR GARDEN PRODUCE, POULTRY, AND BEE-KEEPING.

1. The Society will give annually one or two Minor Silver Medals to a limited number of local Associations or individuals, who establish Competitions and Premiums for Cottages, Gardens, Garden Produce, or Bee-Keeping. The Medals will be granted for two years.

2. The Medals may be offered in any two of the following sections, *but under no circumstances will the two Medals be given in one of the sections*:—

(1) Best kept Cottage or best kept Cottage and Garden. (One Medal only.)

(2) Best kept Garden. (One Medal only.)

(3) Best Collection of Garden Produce—Flowers excluded. (One Medal only.)

(4) Best Pen of Poultry.

(5) Honey. (One Medal only.)

3. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, must not exceed £15. The occupiers of Lodges at Gentlemen's Approach Gates, and Gardeners in the employment of others, are not entitled to compete.

4. If Competition takes place for Garden Produce, such produce must be *bona fide* grown in the Exhibitor's Garden. He will not be allowed to make up a collection from any other Garden. The produce must consist of Vegetables, or Vegetables and Fruit (not Fruit alone). Flowers are excluded.

5. The Honey must be the produce of the Exhibitor's own Hives.

6. To warrant the award of a Medal, there must not be fewer than three Competitors.

7. Blank forms for Reports of Competitions will be furnished to the Secretaries of the different Districts. These must, in all details, be completed and lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Show, and in no case later than *1st November*, for the approval of the Directors, against whose decisions there shall be no appeal.

8. When a grant of Medals has expired, the District cannot apply again for aid for two years, and if no competition takes place in a District for two years the grant expires.

9. Applications for these Medals must be made *before 1st November next*.

Argyllshire.

1. FORESTERS' AND GARDENERS' SOCIETY OF ARGYLL.—*Convener*, John D. Sutherland, Ardconnel Lodge, Oban; *Secretary*, L. A. M'Naught, jun., 111 George Street, Oban. 2 Medals. 1911.

Ayrshire.

2. STEWARTON HORTICULTURAL, AGRICULTURAL, BAKING, AND KNITTING SOCIETY.—*Convener*, John Lindsay, Temple House, Stewarton; *Secretary*, Robert Ferguson, Lainshaw Street, Stewarton. 2 Medals. 1912.

Caithness-shire.

3. CAITHNESS BEE-KEEPERS.—*Convener and Secretary*, John Young, Barrock Schoolhouse, Wick. 2 Medals. 1911.

Fifeshire.

4. NEWBURGH AND DISTRICT.—*Convener*, D. Williamson, Clunie, Newburgh ; *Secretary*, William Duncan, 23 High Street, Newburgh. 2 Medals. 1911.
5. WEMYSS.—*Convener*, David Cunningham, Coaltown of Wemyss ; *Secretary*, William Watson, jun., 5 Lothead Crescent, Coaltown of Wemyss. 2 Medals. 1911.

Kirkcudbrightshire.

6. SOUTH OF SCOTLAND BEE-KEEPERS.—*Convener*, John Ross, Barkerland, Dumfries ; *Secretary*, Q. Aird, Schoolhouse, Howood, Renfrewshire. 2 Medals. 1912.

Lanarkshire.

7. BOTHWELL AND UDDINGSTON.—*Convener*, George Russell, 41 Main Street, Uddingston ; *Secretary*, Hew Young, 7 Kyle Park, Uddingston. 2 Medals. 1910. (In abeyance 1911.)

Nairnshire.

8. AULDEARN AND ARDCLACH.—*Convener*, Sir Frederick G. Dunbar, Bart., Boath, Auldearn, Nairn ; *Joint-Secretaries*, Archibald J. Mackintosh and Angus Bain, Auldearn, Nairn. 2 Medals. 1912.

Peeblesshire.

9. CARLOPS.—*Convener*, Ewen Cameron, Rutherford, Carlops ; *Secretary*, Rev. W. Frank Bruce, Carlops. 2 Medals. 1911.

Perthshire.

10. CALLANDER.—*Convener*, John M'Michael, Commercial Bank, Callander ; *Secretary*, A. M. M'Michael, Commercial Bank, Callander. 2 Medals. 1912.
11. CHERRYBANK.—*Convener*, Alexander Beveridge, Bonnieview, Cherrybank, Perth ; *Secretary*, A. Pirrie, Sunnybrae, Cherrybank, Perth. 2 Medals. 1912.
12. WEST CARSE.—*Convener*, John Sprunt, Schoolhouse, Kinfauns ; *Secretary*, James D. Robb, Inchyra, Glencarse, Perth. 2 Medals. 1911.

Stirlingshire.

13. AIRTH, BOTHKENNAR, CARNOCK, AND DUNMORE.—*Convener and Secretary*, A. Melvin, Carnock, by Larbert. 2 Medals. 1912.
14. CAMPSIE.—*Convener*, James Morrison, Birbiston, Lennoxton ; *Secretary*, William Smith, Geelong, Lennoxton. 2 Medals. 1911.
15. MILTON OF CAMPSIE.—*Convener*, William Young, Craighead, Milton of Campsie ; *Secretary*, R. Dunwoodie, Mount Pleasant, Milton of Campsie. 2 Medals. 1912.

FIRST EDITION.]

NOTE.—From 3rd till 11th July all communications should be addressed to “The Secretary, Secretary’s Office, Showyard, Cupar-Fife.”

Address for Telegrams—“SOCIETY,” EDINBURGH.

Subject to Orders issued by the Board of Agriculture

HIGHLAND AND AGRICULTURAL SOCIETY
OF SCOTLAND

GENERAL SHOW OF STOCK AND IMPLEMENTS
IN KINLOSS PARKS,
CUPAR-FIFE,

ON 9TH, 10TH, 11TH, AND 12TH JULY 1912.

LAST DAYS OF ENTRY.

IMPLEMENTS AND OTHER ARTICLES—Monday, 6th May.

STOCK, POULTRY, AND DAIRY PRODUCE—Friday, 31st May.

No Entry at ordinary fees taken later than those which are received at the Society’s Office, Edinburgh, by first post, or 10 o’clock, on Friday morning (31st May). Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry and Dairy Produce at double fees) till Wednesday morning (5th June), at the Society’s Office, Edinburgh, at 10 o’clock.

President of the Society.

THE RIGHT HON. LORD NINIAN CRICHTON-STUART, M.P.

Chairman of the Board of Directors.

SIR ARCHIBALD BUCHAN HEPBURN OF SMEATON, BART.

Convenor of the Local Committee.

SIR RALPH ANSTRUTHER OF BALCASKIE, BART.

Vice-Convenor.

DAVID FERRIE, PARBROATH.

The District connected with the Show comprises the Counties of Fife, Forfar (Western Division), Kinross, and Perth (Perth Show Division).

REGULATIONS.

GENERAL CONDITIONS.

1. The Competition, except where otherwise stated in the Premium List, is open to Exhibitors from all parts of the United Kingdom.

2. Every Lot must be intimated by a Certificate of Entry, lodged with the Secretary *not later than Monday, 6th May, for Implements and other Articles, and Friday, 31st May, for Stock, Poultry, and Dairy Produce.*

No Entry taken at ordinary fees later than those which are received at the Society's Office by first post, or 10 o'clock, on Friday morning, 31st May. Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry and Dairy Produce at double fees) till Wednesday morning (5th June), at the Society's Office, Edinburgh, at 10 o'clock. Printed forms of Entry will be issued on application to the Secretary, No. 3 George IV. Bridge, Edinburgh. Admission Orders for Exhibits and Attendants will be forwarded to Exhibitors, by post, previous to the Show.

*Licences
for moving
Stock.*

3. This Premium List is published and the Show will be held subject to any Orders that may be issued by the Board of Agriculture or Local Authorities. Any licences that may be required for the movement of Stock into or away from the Show must be obtained by Exhibitors. For these licences, application should be made to the Chief Constable, Fife Constabulary Office, Cupar-Fife.

*Diseased
Animals.*

4. Animals suffering from any form of infectious or contagious disease—including ringworm or other form of infectious or contagious skin ailment—must not be brought to the Show. Those infringing this Rule shall be liable to a fine of 40s., and to have their Stock removed.

*Particu-
lars of
Entries.*

5. No Entry can be received or recorded unless it is accompanied by the necessary fees, and complies fully with the Regulations in the Premium List.

6. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor. The Society shall have power at any time to call upon an Exhibitor to furnish proof of the correctness of any statement in his entry.

7. The name of the Breeder, if known, must be given, and if the Breeder is not known, a declaration to that effect, signed by the Exhibitor, must be made on the Entry Schedule, and no pedigree will be entered in the Catalogue when the Breeder is unknown.

*No substi-
tution of
Animals.*

8. All animals, except calves, foals, and lambs shown with their dams, must be entered in the classes applicable to them, and cannot be withdrawn after entry, or other animals be substituted in their place.

*One Class
only.*

9. For prizes given by the Society, no animal shall be allowed to compete in more than one class, or to compete in any class except that prescribed for animals of its pedigree and description; but this Rule does not apply to the Jumping and Driving Competitions.

Ownership.

10. All stock exhibited at the Show, except where otherwise stated in the Premium List, must be from the time of entry to the date of the competition the *bona fide* property of the Exhibitor in whose name it is entered.

*Responsi-
bility for
Entries.*

11. Exhibitors are alone responsible for the accuracy and eligibility of their entries. The recording of an entry or the admission of the exhibit to the Showyard will not relieve the Exhibitor of this responsibility. The entry-fee paid for an animal entered in a class for which it is not eligible is not returnable.

*Society not
liable.*

12. The Society shall not be liable for any loss or damage which Stock, Poultry, Dairy Produce, Implements, or other articles may sustain at the Show, or in transit.

*Disquali-
fied Ex-
hibitors.*

13. The Society reserve to themselves the right of refusing, cancelling, or prohibiting the exhibition of entries from any person who, after 1st January 1904, has been expelled from the membership of any Agricultural or Dairy Society, or who may have been prohibited, suspended, or disqualified from making entries or exhibiting at the Show or Shows of any Agricultural or Dairy Society or Breed Society in consequence of having attempted to obtain a Prize by giving a false Certificate, or by other unfair means, or who is under exclusion from any Breed Society for fraudulent practices.

*Animal
Disquali-
fied.*

14. When an animal has previously been disqualified by the decision of any Agricultural Society in the United Kingdom, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to

state it, and the grounds thereof, in his entry, to enable the Directors to judge of its validity.

15. Any artificial contrivance or device of any description found on or proved to have been used on an animal, either for preventing the flow of milk or for any other improper purpose, will disqualify that animal from being awarded a Premium, and the Owner of said animal may be prohibited from again entering Stock for any of the Society's General Shows, for such a period as the Directors may see fit. *Tampering with Animals.*

16. The Society further reserve to themselves the right of refusing any entries they may think fit to exclude, or to cancel any entry made, or to prohibit the exhibition of any entry. *Rejecting Entries.*

17. Stock entered for competition, and actually in the Show, is subject to the control and under the orders of the Stewards, Secretary, and other Show officials of the Society, and such stock may not be withdrawn from competition without the consent of the Stewards or Secretary. *Control of Exhibits.*

18. Persons making insulting remarks to, or in any way unduly interfering with, the Judges, Stewards, or other officials while in the performance of their duties, and all Exhibitors or others in charge of stock while in the judging rings refusing to accept or display tickets, rosettes, &c., awarded by the Judges, and handed to them by the Stewards or other officials, or tearing up tickets, rosettes, &c., so awarded and handed to them, or of any similar conduct, shall be considered guilty of misconduct, and shall be dealt with under these rules. *Improper Conduct.*

19. All persons in charge of stock or other exhibits, and all persons admitted into the Showyard, shall be subject to the rules of the Society, and shall obey the orders of the Stewards, Secretary, and other officials of the Society. Exhibitors shall be answerable for the conduct of their servants or representatives. *Subject to Orders.*

20. The Stewards and other officials have power to enforce the regulations of the Society in their different departments. *Power of Officials.*

21. A protest having reference to exhibits at the Show may be lodged by any person having interest. Protests having reference to competitions which take place on the first day of the Show must be lodged in writing with the Secretary at his Office in the Showyard not later than 9 A.M. on Wednesday, the second day of the Show, and parties must be in attendance at the Secretary's Office in the Showyard at 9.30 A.M. that day, when protests may be disposed of. Protests relating to competitions taking place after the first day of the Show must be lodged before 5 P.M. on the day on which the particular exhibition takes place. Each protest must state specifically the grounds of objection, and must be accompanied by a deposit of £2, 2s., which deposit may, if the objection be proved frivolous to the satisfaction of the Directors, be forfeited. Protests may be lodged at any time by Directors, and in this case no deposit will be required. Protests will be heard and determined by the Directors. Protests on veterinary grounds not received. *Protests.*

22. The violation of any one of the regulations, or disobedience of the orders of the Directors, Stewards, Secretary, or other officials of the Society, shall render the offending person liable to the forfeiture of all premiums awarded to him, or of such a portion as the Directors may ordain, and also liable to be expelled from the membership of the Society, and disqualified from again, or for a certain number of years, exhibiting at the Shows of the Society, or to have his case disposed of by fine or otherwise as the Directors may determine. *Penalties for Offences.*

23. The decision of the Directors shall, in every matter arising at or in connection with the Show, be final; and every person present at the Show, whether as a Judge, Exhibitor, Visitor, or otherwise, shall be deemed thereby to have agreed to refer the subject-matter of such decision to the final determination of the Directors to the exclusion of all Courts of Law. *Final Authority.*

24. All decisions under these rules may, along with the names and addresses of the persons against whom such decisions have been pro- *Intimating Decisions.*

nounced, be communicated by the Secretary of this Society to the Secretaries of all Agricultural or Dairy Societies holding open Shows in the said United Kingdom, and to the Secretaries of all Breed Societies in said United Kingdom, and may be published in the Annual Reports of this Society, and in such newspapers or journals as the Directors may determine; and every Exhibitor competing at the Show, and every person present at the Show, whether as a Director, Member of Committee, Steward, Judge, Exhibitor, Visitor, or otherwise, shall be deemed thereby to have consented to such communication and publication.

*Former
Winners.*

25. An animal to which a first Premium has been awarded, even if it should not qualify for that Premium, or an animal which subsequently becomes entitled to a first Premium, at a General Show of the Society, cannot again compete in the same class, notwithstanding any alteration in the heights stated for such class, but may be exhibited as Extra Stock.

*Herd-
books.*

26. Shorthorn, Aberdeen-Angus, Galloway, and Highland cattle must be entered in the herd-books, or the Exhibitor must produce evidence that his animal is eligible to be entered therein.

*Height of
Horses.*

27. All Horses or Ponies entered in classes in which a particular height is stated shall before being judged be measured with their shoes on. No subsequent measuring or alteration of shoes will be permitted.

*Weight of
Shoes.*

28. Exhibitors of Hackney and Harness Horses shall be required to adhere to the Rules and Regulations of the Hackney Horse Society with regard to the weight of shoes on their exhibits, the Society's Veterinary Inspector being instructed to examine all the Hackneys and Harness Horses on the opening morning of the Show, and see that the following Rules as to the weight of shoes are attended to, viz.—(a) For Hackneys exceeding 14 hands (except Hackney yearling colts and Hackney yearling fillies), no shoe (nails included) may exceed 2 lb. in weight; (b) for Ponies not exceeding 14 hands, Hackney yearling colts and Hackney yearling fillies, no shoe (nails included) may exceed 1½ lb. in weight.

*Overfeed-
ing.*

29. Breeding Stock must not be shown in an improper state of fatness, and the Judges are requested not to award Premiums to overfed animals; and no Cattle or Sheep which after the age of twelve months have been exhibited as Fat Stock at any Show are eligible to compete in the Breeding Classes for the Society's Prizes.

Sires.

30. Aged Bulls and Stallions must have had produce, and, along with two-year-old Bulls, three-year-old Colts, and two-shear and aged Tups, have served within the twelve months immediately preceding the Show.

Cows.

31. Except as may be otherwise specially provided in this Premium List, cows of all breeds (other than Ayrshire) must have had a calf within nine months previous to the Show, and when exhibited must be in milk. Cows of the Ayrshire breed must have had a calf within fifteen months previous to the Show. Animals of any age that have had a calf must be shown as Cows.

*In-calf
Heifers.*

32. Two-year-old Heifers of the Shorthorn, Aberdeen-Angus, and Galloway breeds, two-year-old Yeld Ayrshire Heifers, and three-year-old Highland Heifers, must be in calf when exhibited, and the Premiums will be withheld till birth be certified, which must be within nine months after the Show.

Mares.

33. A Mare entered in a class for "Mares with foal at foot" must have produced a foal after 1st January of the year of the Show, must have regularly nursed her own or another foal, and must have the foal with her in the Show. If the mare's own foal is alive it must be the foal shown with the mare. In the case of a Mare that has not foaled before the Show, or whose foal has died, she shall, if not in milk, be eligible without further entry to compete among the Yeld Mares if a corresponding class for Yeld Mares be included in the Premium List. Agricultural Yeld Mares must produce a foal within twelve months from the first day of the Show. A Mare in a class for "Mares or Geldings" may or may

not have had a foal in the year of the Show, but shall not have her foal exhibited with her, nor be in milk at the time of the Show.

34. All Sows farrowed prior to the year before the Show must have produced a litter of pigs in the year of the Show before the opening day. Sows farrowed in the year prior to the year of the Show must either have produced a litter of pigs before the Show, or produce a litter within three months of the last day of the Show. Certificates of the date of farrowing must be supplied in every case. *Sows.*

35. With reference to Regulation 32, birth of a live or full-time calf must be certified; and in regard to Regulation 33, birth of at least a nine months' foal; or in the case of the death of the dam, a Veterinary Surgeon's certificate must be produced certifying that at the time of death the animal was so far advanced with calf or foal that if it had lived it would have produced a calf or foal within the periods stated in Rules 32 and 33. Certificates of calving required by the foregoing Regulations must reach the office of the Secretary within ten months, farrowing certificates within four months, and foaling certificates within thirteen months, of the last day of the Show. In default of this, the animal will be regarded as having failed to fulfil the Regulations, and the prize will therefore pass to the animal next in order of merit or be forfeited. *Calves and Foals. Calving, Farrowing, and Foaling Certificates.*

36. Except when otherwise provided, the awards of Special Prizes shall not be subject to the Regulations as to calving and foaling. *Special Prizes.*

37. The Premiums awarded, except those withheld till birth of calf or foal or litter of pigs is certified, will be paid as soon after the Show as practicable, and, with the exception of the Tweeddale Gold Medal, Special Cups, and Medals, may be taken either in money or in plate. *Payment of Prizes.*

38. In the classes for Hunters, Judges are empowered to transfer to the proper classes horses which, in regard to weight-carrying, are in their opinion entered in the wrong classes. *Hunters.*

39. Judges are particularly requested to satisfy themselves, as far as possible, regarding the soundness of all Horses before awarding the Prizes, and to avoid giving Prizes to animals showing symptoms of hereditary diseases. The Judges may consult the Society's Veterinary Surgeon if they deem it expedient. Private accommodation is provided for the examination of horses by the Veterinary Surgeon. No protests on veterinary grounds will be received. *Soundness of Horses. Accommodation for examination.*

40. All Ewes must have reared lambs in the year of the Show; and Ewes of the Blackface and Cheviot breeds must be in milk, and have their lambs at foot. *Ewes.*

41. Sheep must have been clipped bare after the first day of the November preceding the Show, no part of the animal to be clipped prior to that date—this Rule not to apply to Cheviot Sheep. *Clipping.*

42. The Steward of Sheep, who can call in assistance if so desired by him, shall have full power to disqualify any pen of Blackface Sheep which he considers unnaturally coloured or when the fleece has been dealt with by the use of foreign substances. *Colouring Blackface Sheep.*

43. In Poultry the Aged Birds must have been hatched previous to, and Cockerels and Pullets in, the year of the Show. *Poultry.*

44. Railway Certificates for Stock and Implements are issued to Exhibitors before the Show along with their Tickets of Admission, one Certificate for the outward and another for the return journey being sufficient for each Exhibitor for any number of exhibits. *Railway Passes.*

45. Poultry and Stock will be admitted on Monday, the day before the opening of the Show, and, with the exception of Horses, must be in the Yard before 12 o'clock that night. Horses must be in before 8 o'clock on the morning of Tuesday, except those entered in classes for which other times for arrival are elsewhere stated in this List. Judging begins at 9.30 A.M. on Tuesday. Exhibited on Tuesday, Wednesday, Thursday, and Friday. Stock may be admitted on the Saturday preceding the Show, *Admission of Stock.*

but only by sending two days' prior notice to the Secretary's Office in the Showyard.

Parades.

46. Horses and Cattle must be paraded at the times stated in the Programme of the Show, and when required by the Stewards, and under their direction. In Parade, Horses must be ridden or led as provided in their respective classes. Prize and commended Cattle and Horses will receive two rosettes each, which must be attached to the head of the animal, one on each side. Attendants must be beside their animals *twenty minutes before the hour of Parade*, and be ready to proceed to the ring immediately on receiving the order of the Stewards. Infringement of this Rule, or failure of any attendant to obey the orders of the Society's officials, will render the Exhibitor liable to a fine of 20s. for each separate infringement or act of disobedience, and to the forfeiture of any or all of the Prizes awarded to him at this Show.

Responsibility of Exhibitors.

47. Exhibitors shall be answerable for all acts, whether committed by themselves, their servants, or others in charge of their Stock, and shall be responsible for the condition of their animals during the whole time they remain in the Showyard.

Moving from stalls.

48. No animal shall be taken out of its stall after 10 A.M. during the Show except by order of the Stewards, or with permission of the Secretary.

Washing Cattle.

49. Cattle shall not be taken out of their stalls to be washed after the Judging Rings has been commenced. Cattle must not be washed beside the Judging Rings. Those infringing this Rule shall be liable to a fine of 10s.

Soaping prohibited.

50. Soap or other adhesive material must not be used in dressing cattle or horses. Infringement of this Rule will render the animal upon which the material is used liable to be disqualified.

Accommodation.

51. Loose-boxes will be provided for all horses; covered accommodation for other live stock. Boxes (floored) for attendants on Cattle, Horses, Sheep, and Pigs will be provided at a charge of 20s. for each box for members; 25s. for non-members. (See Rule 76.)

Floored boxes and stalls for Animals.

52. Exhibitors requiring the boxes, stalls, or pens for their animals to be floored must give instructions to the Showyard contractors, Messrs Macandrew & Co., Showyard, ten days before the Show opens. (For charges, see Rule 75.)

Securing Cattle.

53. Bulls must be secured by nose-rings, with chains or ropes attached, or with strong halters and double ropes. All Cattle, other than Highland Cattle, must be tied in their stalls.

Concealing Animals.

54. During the time the Show is open to the public no rug shall be hung up so as to conceal any animal in a horse-box or stall, except with the special permission of the Steward of that department.

Fodder.

55. Five days' supply of straw, hay, grass, and tares will be provided free by the Society. Any additional fodder or other kinds of food required will be supplied at fixed prices in the Forage-yard. Any servant removing bedding from an adjoining stall will be fined in double the amount taken. Exhibitors may fetch their own cake or corn to the Yard, but not grass, tares, hay, or straw. Coops, food, and attendance for Poultry will be provided by the Society.

Feeding appliances.

56. Servants in charge of Stock must bring their own buckets or pails, and a piece of rope or sheep-net to carry their forage. Mangers, sheep and pig troughs, will be provided.

Sawdust.

57. Sawdust must not be used as bedding for Stock.

Water.

58. As the command of water in the Yard is limited, it is particularly requested that waste be avoided.

Lights and Smoking.

59. No lights allowed in the Yard at night, and Smoking is strictly prohibited within the Sheds. Those infringing this Rule shall be liable to a fine of 10s.

Removal of stock.

60. Stock or Poultry cannot be removed from the Yard till 5 P.M. on Friday, the last day of the Show, except on certificate by the Veterinary

Surgeon employed by the Directors, countersigned by the Steward of the department or the Secretary.

61. At the close of the Show on Tuesday, Wednesday, and Thursday, horses may be withdrawn for the night on a deposit of £5 for each animal, which shall be forfeited, along with any prize money it may have gained, if the animal is not brought back. They must return between 7 and 7.30 the following morning, and those not in before 8 shall forfeit 10s. Horse passes to be applied for at the Secretary's Office between 5 and 6 p.m. on Tuesday, and the deposit, unless forfeited in whole or in part, will be returned between 12.30 and 2.30 on Friday. *Withdrawal of horses overnight.*

62. When the Stock is leaving the Yard, no animal is to be moved till ordered by those in charge of clearing the Yard. Those transgressing this Rule shall be liable to a fine of 10s., and to be detained till all the other Stock is removed. *Order in removal.*

63. Poultry may be penned before the opening and removed at the close of the Show by Exhibitors themselves or their representatives. In the event of neither the Exhibitor nor an authorised representative of the Exhibitor being present to pen or remove Poultry, the birds will be penned and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of Exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to Exhibits by errors or accidents in penning, despatching, or conveying Exhibits. *Penning and removing Poultry.*

64. On the opening day of the Show the Poultry Shed will be closed to the public during the Judging. On the last day of the Show the Poultry Shed will be closed to the public at 4 p.m.; at 5 p.m. Exhibitors or their representatives will be admitted to the Shed to remove Exhibits, provided the Exhibitor has, *not later than 11 a.m. on the last day of the Show*, given written notice to the Secretary to the effect that the Exhibitor or the Exhibitor's representative will attend at the Poultry Shed at 5 p.m. to remove the birds. *Closing of Poultry Shed.*

JUDGING STOCK AND POULTRY.

65. On Tuesday, the first day of the Show, no person will be admitted, except Servants in charge of Stock, till 8 a.m., when the Gates are opened to the public. *Opening Gates.*

66. The Judges will commence their inspection at 9.30 a.m. The spaces reserved for the Judging will be enclosed, and no encroachment shall be permitted. *Judging.*

67. In no case shall a Premium be awarded unless the Judges deem the animals to have sufficient merit; and where only one or two lots are presented in a section, and the Judges consider them unworthy of the Premiums offered, it shall be in their power to award a lower prize. *Insufficient merit.*

68. In addition to the Premiums, the Judges may award one Very Highly Commended, one Highly Commended, and as many Commended tickets in each class as they consider justified by the number and merit of the entries. *Commendations.*

69. Ayrshire Cows which have not calved before the Show, whether entered in a class for Cows in Milk or for Cows in Calf, shall be judged along with the Cows in Calf, and Ayrshire Cows or Heifers which have calved before the Show—in whichever of the classes entered—shall be judged along with Cows in Milk. *Ayrshire Cows and Heifers.*

70. Attending Members will accompany each section of the Judges. It will be the duty of Attending Members to bring the animals out to the Judges and to see that no obstruction is offered to them, and that the space reserved for them is not encroached upon; to ticket the prize animals; to send the Nos. of the prize animals to the Award Lectern near the Secretary's Office; to assist the Judges in completing their *Attending Members' duties.*

return of awards; and should any difficulty arise, to communicate with the Stewards or Secretary.

71. It shall not be competent for any Exhibitor, nor for his Factor or Land-Steward, to act as a Judge or attending Member in any class in which he is competing.

DAIRY PRODUCE.

72. Dairy Produce will be received in the Showyard on Monday, the day before the opening of the Show, and till 8 A.M. on Tuesday, the first day of the Show. Judged at 9.30 A.M. on Tuesday. Exhibited Tuesday, Wednesday, Thursday, and Friday.

*Placing
and re-
moving
Dairy
Produce.*

73. Dairy Produce must have been made on the Exhibitor's farm in the year of the Show. No Exhibitor shall show more than one lot in each class. Exhibits of Dairy Produce may be placed before the opening and removed at the close of the Show by Exhibitors themselves or their representatives. In the event of neither the Exhibitor nor a person with written authority from the Exhibitor being present to place or remove exhibits, they will be placed and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of Exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to exhibits by errors or accidents in placing, despatching, or conveying exhibits. In the case of exhibits which are not removed by 5.30 P.M. on the closing day of the Show, the Society will hold itself at liberty to hand them over to the railway companies for despatch to the respective Exhibitors.

STALL RENT (INCLUDING ENTRY FEE).

Stall Rent. 74. The Stall Rents (which include Entry Fees) as stated opposite the individual Classes in this List, shall be paid by Exhibitors when making their Entries.

*Floored
Stalls.* 75. Exhibitors desiring the boxes, stalls, or pens for their animals to be floored can have this done by giving instructions, ten days before the opening of the Show, to the contractors, Messrs Macandrew & Co., the Showyard, to whom the following charges for flooring have to be paid: Horses, 10s. each; Ponies, Cattle, Sheep, and Swine, 7s. each.

ACCOMMODATION FOR ATTENDANTS.

76. Boxes for accommodation of attendants on Stock will, if desired, be provided beside the Stock at a charge of 20s. per box for members and 25s. for non-members. Attendants' boxes will be floored and lined with wood, with door. Applications for attendants' boxes must accompany entries of Stock, and Exhibitors must state next to which animal the attendants' box is to be placed. Attendants' boxes cannot be guaranteed after the closing date.

IMPLEMENTS AND OTHER ARTICLES.

Admission. 77. Implements will be received in the Yard from Tuesday, 2nd July, till 5 o'clock on the afternoon of Monday, 8th July. Exhibited Tuesday, Wednesday, Thursday, and Friday. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor, and prices must be stated.

Premiums. 78. No Money Prizes or Medals, except when specially offered, will be given by the Society for Implements of any kind.

79. Agricultural Implements, and Implements and collections of articles not Agricultural, will be received for Exhibition, but the Secretary is entitled to refuse Entries from dealers in articles not deemed worthy of Exhibition. *Refusing Entries.*

80. In order to encourage exhibits of Agricultural Implements from operative Blacksmiths and Carpenters in the district of the Show, open space will be provided for these in some less prominent part of the Yard at a charge of 10s. for space 10 feet wide and 20 feet deep. *Local Operatives.*

81. Every article to be exhibited must be entered on the Society's Entry Form. Any article not so entered that is taken to the Show is liable to be ordered out of, or removed from, the Showyard, or confiscated to the Society. Exhibitors infringing this rule are moreover liable to a fine of £1. *Articles not entered.*

82. "Cheap-Jacks" are not admitted to the Showyard. The selling of goods by auction, shouting, and other behaviour calculated to annoy visitors or Exhibitors, are strictly forbidden. Exhibitors infringing this Regulation are liable to a fine of £1, and to have themselves and their goods ordered out of, or removed from, the Showyard, or to have their goods confiscated to the Society. *Selling by auction and noisy behaviour forbidden.*

83. The articles of each Exhibitor must be all placed in one stand, except Implements in motion, and must not on any account extend beyond the allotted space. No article shall be moved out of its stand, or the stand dismantled, till the termination of the Show, at 5 p.m. on Friday. Those infringing this Rule shall be liable to a fine of 10s. *Placing Exhibits. Removing Exhibits.*

84. When the ground requires to be broken, the turf must be carefully lifted and laid aside, and the surface must be restored to the satisfaction of the Society, and at the expense of the Exhibitor. Failing this being done, the Society shall be at liberty to restore the ground and charge the cost to the Exhibitor. *Restoring Turf.*

85. Exhibitors must arrange their own articles within the space allotted to them before 9 o'clock on Tuesday, and to the satisfaction of the Stewards in charge of the Implement Yard. Exhibitors are prohibited from subletting space allotted to them, and from displaying the name of any other firm on their Stand. All signs, except signs on gables, must face the front only. Nails must not be driven into the canvas. *Arranging Exhibits. Signs.*

86. Exhibitors are not allowed to distribute handbills anywhere in the Yard except at their own Stand; and they must not for this or any other purpose encroach upon the adjacent alleys or open spaces. *Handbills.*

87. Exhibitors are required to have their Stands and the portions of the alleys immediately adjoining them swept up before eight o'clock on each morning of the Show. *Sweeping Stands, &c.*

88. All Machines requiring steam or fire must be entered as such in the Certificate, and will be placed in the Motion Yard. *Coke only shall be used in all cases where fire is required.* Coal shall not be used at any time in the Showyard. Those infringing this Rule shall incur a penalty of £5. *Fuel.*

89. No Steam Engine shall be driven in the Yard at a greater speed than 4 miles an hour. Traction Engines shall not be used in conveying Exhibits or other goods into, from one place to another in, or out of the Showyard. Without written permission by the Steward of Implements or Secretary, Motor Waggons shall not be used in conveying goods into or out of the Showyard. *Steam Engines. Motors.*

90. Locomotive and Traction Engines and other Machines must not be moved from their places without permission of the Secretary or Stewards, and must not leave their stands till 6 p.m. on Friday. *Traction Engines.*

91. There must be attached to each Implement, when forwarded to the Show, a label bearing the Exhibitor's name, and that of the Implement, as well as the number of the Exhibitor's stand. *Consigning Implements.*

92. The carriage of all Implements must be prepaid.

93. Photographing in the Showyard is not permitted, except by photographers having a Stand in the Showyard or holding a "Photographer's graphing" *Photographing*

*in Show-
yard.*

"Ticket." The "Photographer's Ticket" may be had from the Secretary, price 15s. It admits the holder to the Show when open to the public and entitles him to photograph in the Showyard, subject to arrangements made by the Stewards.

*Covered
Booths.*

94. Covered Booths for Offices (9 feet by 9 feet), purely for business, not for exhibition of goods, can be had for £3, 10s. to Members and £5 to Non-Members.

*Exhibitors'
and Atten-
dants'
Tickets.*

95. Each Exhibitor in the Implement Department who is not a Member of the Society will receive one free Ticket of Admission to the Showyard for himself or a member of his firm, and will receive, in addition, for the use of attendants employed by him at his Stand, two Tickets of Admission for each complete ten feet of shedding in the Motion Yard, and one Ticket for each complete ten feet of shedding in the other sections. No additional Free Tickets can be issued in any circumstances whatever. Additional Attendants' Tickets, not more than five for one Exhibitor, may be obtained by application in writing by the Exhibitor at 5s. each. No tickets will be issued without an Order.

*Tickets to
be filled
up and
signed.*

96. The Tickets of Admission for Exhibitors and Attendants referred to in the foregoing Regulation will (about fourteen days prior to the Show) be issued to the Exhibitors in blank, with the number of the Exhibitor's Stand. The name of the person for whom each ticket is intended must be written on it before it is used. Each person holding a Free Ticket of Admission must sign his or her name on the back thereof, and must also, when required, sign his or her name in the book at the Entrance Gate. Exhibitors' attendants are strictly cautioned not to lend or transfer their Tickets, which can be used only by the persons whose names they bear, and who must be *bona fide* acting for, or employed by, the Exhibitor. No Ticket is transferable. An Exhibitor is liable to a fine of £1 for each case of transfer or other improper use of a Ticket issued to himself or employee.

*Tickets
not Trans-
ferable.*

*Improper
use of
Tickets.*

*Admission
of Supplies
for Stand-
holders.*

97. The following are the arrangements for the admission of Supplies (Refreshments or other goods) for Stand-holders during the Show: Messenger on foot (with or without hand-barrow) with supplies, admitted by Special Ticket; price for one admission, 1s., for the four days, 3s. Horse vehicle and driver with supplies, admitted by Special Ticket; price for one admission, 1s., for the four days, 5s. These Special Tickets may be had from the Secretary. Horse vehicles, with supplies, admitted throughout the day on the first day of the Show; on the other three days they will not be admitted between the hours of 10 A.M. and 5 P.M. except by written permit from the Secretary.

Cycles.

*Allocation
of space.*

Accidents.

98. The riding of Cycles in the Showyard is prohibited.

99. The Society reserves the right to allot to applicants for Stands either the whole or part of the space they ask for.

100. The Society will not be responsible for any accident that may occur from the machinery belonging to any Exhibitor; and it is a condition of entry that each Exhibitor shall hold the Society harmless, and indemnify it against any legal proceedings arising from any accident caused by his machinery.

*Alcoholic
Drinks.*

Gas.

101. The giving of Alcoholic Drinks to visitors at Stands in the Show is strictly prohibited.

102. Exhibitors desiring the use of gas in the Showyard should apply to the Manager of the Cupar Gas Co., Ltd., Cupar-Fife, not later than Saturday, 1st June.

103. Ground to be taken in spaces of 10 feet frontage by 20 feet deep, except in Motion Yard, which is to be 10 feet or larger amount of frontage by 50 feet deep. Exhibitors must take their space in one or other of the following Sections. Space is not let partly covered and partly open. Exhibits not in motion may be excluded from the Motion Yard. The space in the Motion Yard being limited in extent, and intended mainly for exhibits in motion, not more than one-fifth of the space allotted to any one Exhibitor—and in no case more than 400

square feet—may be occupied in the Motion Yard by exhibits not in motion.

104. The maximum extent of space which any one Exhibitor may apply for shall be 40 feet of frontage in the Motion Yard, and 100 feet of frontage in the other Sections. *Maximum Space.*

105. Rates for space, payable by Exhibitors when making their Entries :—

	Members.	Non-Members.
1. Space without Shedding, 20 ft. deep, per 10 ft. .	£1 5 0	£1 15 0
2. Special Space, without Shedding, 20 ft. deep, per 10 ft. .	2 0 0	2 10 0
3. Ordinary Shedding, 20 ft. deep, 7 ft. to eave, per 10 ft. .	1 5 0	1 15 0
4. Special Shedding, 20 ft. deep, 7 ft. to eave, per 10 ft. .	2 0 0	2 10 0
5. Ordinary Shedding, 20 ft. deep, 7 ft. to eave, <i>close boarded at back</i> , per 10 ft. .	1 12 0	2 2 0
6. Special Shedding, 20 ft. deep, 7 ft. to eave, <i>close boarded at back</i> , per 10 ft. .	2 7 0	2 17 0
7. *Motion Yard, without Shedding, 50 ft. deep, per foot .	0 5 0	0 8 0
8. *Motion Yard, with Shedding (10 ft. open behind, 20 ft. covered, and 20 ft. <i>open in front</i>), 11 ft. to eave, per foot .	0 7 0	0 10 0
9. Covered Booths for offices, 9 ft. by 9 ft., each .	3.10 0	5 0 0
10. Newspaper offices, 9 ft. by 9 ft., each .	£2, 10s.	

* See Rules 103 and 104.

ADMISSION OF THE PUBLIC.

The public will be admitted daily at 8 A.M. Judging begins on Tuesday at 9.30 A.M. The charges for admission to the Yard will be—Tuesday, from 8 A.M. till 5 P.M., 5s. Wednesday, from 8 A.M. till 5 P.M., 3s. Thursday, from 8 A.M. till 5 P.M., 2s. Friday, from 8 A.M. till 5 P.M., 1s.

On Thursday and Friday children under twelve years of age admitted at half price.

No Pass-out Checks given, and no re-admission without payment.

ADMISSION OF MEMBERS AND EXHIBITORS.

On exhibiting their "*Member's Ticket*," which is strictly not transferable, Members of the Society are admitted free to the Showyard and (provided there is room) to the Enclosures and Stands around the Large Ring, excepting the Reserved Seats in the Grand Stand, and such other parts as may be specially reserved. Tickets will be sent to all Members residing in the United Kingdom whose addresses are known, and on no account will duplicates be issued. All Members not producing their tickets must pay at the gates, and the admission money will not on any account be returned. Tickets must be signed by Members before being presented at the gate.

Tickets of admission to the Showyard are sent to Exhibitors of Stock, Poultry, and Dairy Produce (not Members) whose Entry Fees amount to not less than 10s.

For Exhibitors of Implements and their assistants tickets are issued as provided in the Regulations for Implements.

RESERVED SEATS IN GRAND STAND.

For Charges and Tickets, apply to Secretary.

VARIOUS.

Exhibitors may display their own Placards *inside and in front* of their stands ; with this exception, no Bills of any kind other than those of the Society are permitted on any of the Show erections. No newspapers or any other article to be carried about the Yard for sale or display.

No Carriages or Equestrians admitted without special leave from the Directors, and then only for Invalids. Bath-chairs may be brought in.

Premium Lists, Regulations, and Certificates of Entry may be obtained by applying at the Secretary's Office, No. 3 George IV. Bridge, Edinburgh.

All Communications should be addressed to The Secretary of the Highland and Agricultural Society of Scotland, No. 3 George IV. Bridge, Edinburgh. From 3rd to 11th July, to the Secretary's Office, Showyard, Cupar-Fife.

Address for Telegrams—"SOCIETY," EDINBURGH.

LAST DAYS OF ENTRY.

IMPLEMENTS AND OTHER ARTICLES—Monday, 6th May.

STOCK, POULTRY, AND DAIRY PRODUCE—Friday, 31st May.

No Entry at ordinary fees taken later than those which are received at the Society's Office, Edinburgh, by first post, or 10 o'clock, on Friday morning (31st May). Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry and Dairy Produce at double fees) till Wednesday morning (5th June), at the Society's Office, Edinburgh, at 10 o'clock.

RAILWAY ARRANGEMENTS.

The Railway Companies will be furnished with a list of the Exhibitors of Stock and Implements, after the 21st June. All applications for horse-boxes and trucks, and for information as to arrangements of Special Trains, must be made by the Exhibitors themselves to the Stationmaster where their stock is to be trucked.

The arrangements made by the Railway Companies for the conveyance of Live Stock and Goods to and from the Show are indicated below, but exhibitors are recommended to apply to the respective companies for full particulars:—

1. Live Stock and Goods to the Show to be charged ordinary rates.
2. Live Stock and Goods from the Show, *if sold*, to be charged ordinary rates.
3. Live Stock from the Show, *if unsold* and returned not later than the second day after the closing day of the Show (Sunday to be treated as a *die non*), to be carried at half rates back to the station whence they were sent, at owners' risk, on surrender of a certificate from the Exhibitor to the effect that they are really unsold; failing surrender of such certificate, ordinary rates must be charged. The reduction to half rate is to be allowed only when the animals or goods are consigned to be returned by the same route as that by which they were conveyed to the Show, but it shall be in the option of the Railway Company or Companies to return the animals or goods at half rates by a different route owned by the same Railway or Railways over which the consignment was carried on the outward journey. The minimum charge for Stock returned at half rates will be one-half the ordinary minimum.

If the unsold Live Stock which was carried on the outward journey by Passenger Train in horse-boxes be required to be returned by Goods Train in cattle trucks, half the Goods Train rates must be charged.

If the unsold Live Stock which was carried on the outward journey by Goods Train in cattle trucks be required to be returned by Passenger Train in horse-boxes, half the Passenger Train rates must be charged.

4. Horses and Cattle, when sent for exhibition from one Agricultural Show to another, in another part of the country, are charged the ordinary single rates in respect of each journey, from point to point, up to the last station to which they are sent for exhibition. If remaining unsold when returned from the latest Show to the originating or home station, they are—on surrender of the necessary certificates—charged half rates at owners' risk, provided such return journey is made by the line of the company by whose route it was conveyed on the outward journey, and provided the railway traversed was covered on the outward journey; but it shall be in the option of the Railway Company or Companies to return the animals at half rates by a different route owned by

the same Railway or Railways over which the consignment was carried on the outward journey. If conveyed by Goods Train, unsold Live Stock transferred from one Agricultural Show to another in another part of the country must be charged ordinary rates up to the latest Show, from which they will be returned to the original forwarding station at half rates at owners' risk, as above.

5. Unsold goods, previously carried by railway, transferred from one Agricultural Show to another, in another part of the country, or exhibited at several Shows consecutively, and returned to the station from whence originally sent, will be conveyed at half rates at owners' risk, on production of certificate from the Exhibitor to the effect that they are unsold; failing production of such certificate, ordinary rates will be charged. This applies only to Goods Trains.

6. Poultry to be charged ordinary rates both ways, and will not be accepted for conveyance unless the carriage charges are prepaid.

7. Horse-boxes, or other Passenger Train vehicle, will not be provided for the carriage of Live Stock sent by Goods Train and invoiced at Goods Train rates. *For rates for Horse-boxes by Passenger and Special Trains, apply to the Railway Companies.*

8. Provender conveyed to Agricultural Shows with Live Stock will be charged ordinary rates, except so much of the same as may be required on the journey.

9. Men, certified by the owners to be *bona fide* in charge of Live Stock, to be conveyed free in the same train as the animals, as follows: *In Horse-boxes* [Horses and Cattle]—One man for each consignment, except where the consignment requires more than one vehicle, when one man for each vehicle may be sent free; but where two or three horses or cattle forming one consignment are sent in the same horse-box, and a man is required to travel with each animal, a man for each animal may be conveyed free, provided each animal is charged for separately. *In Horse-boxes* [Small Animals] and *in specially constructed Cattle Trucks* [Cattle or other Animals]—One man to each vehicle. Upon both the outward and homeward journeys a separate certificate and contract must be given, which must be retained by the stationmaster at the outward or homeward starting-point, as the case may be.

10. The ordinary rates charged for carriage do not in any case include delivery to, or collection from, the Show ground.

11. Agricultural Societies' Show Plant must be charged at Class C rates, station to station.

12. Tents, Canvas, and other articles, not for exhibition, to be charged the ordinary rates both going and returning.

13. The carriage of all Live Stock, Implements, and other articles going to the Show for exhibition must be *prepaid*.

DELIVERY AND COLLECTION CHARGES.

The following will be the Charges for the Delivery or Collection of Live Stock, Implements, and other articles between the Railway Station at Cupar-Fife and the Show ground:—

1. General traffic, 2s. 6d. per ton (minimum charge, 1s. 6d.)
2. Implements and Machinery (Agricultural), not exceeding 1 ton each, 2s. 6d. per ton (minimum charge, 2s.)
3. Implements and Machinery (Agricultural), on their own wheels (specially hauled), not exceeding 1 ton, 2s. 6d. each.
4. Single articles, exceeding 1 ton but not exceeding 3 tons, 3s. per ton.
5. Single articles, exceeding 3 tons but not exceeding 5 tons, 6s. per ton.
6. Single articles, exceeding 5 tons, by special arrangement only, but no less charge than 8s. per ton.
7. Rustic Houses, by special arrangement only, but no less charge than 7s. 6d. per load.
8. Carriages, four-wheeled, 2s. 6d. each.
9. Carriages, two-wheeled, 1s. 6d. each.
10. Cattle, in floats, 2s. 6d. per head; minimum charge, 4s.
11. Sheep and Pigs, in floats, 9d. per head (minimum charge, 2s. 6d., and maximum charge, 5s. for each float).
12. Parcels or Hampers by Passenger Train, 3d. each; minimum charge, 6d.

THE PRESIDENT'S CHAMPION MEDALS

A Champion Medal is given by The Right Hon. LORD NINIAN CRICHTON-STUART, M.P., President of the Society, for the *best Animal or pen* in each of the following sections:—

1. Shorthorn.	8. Fat Cattle.	14. Ponies.	20. Border Leicester.
2. Aberdeen-Angus.	9. Clydesdale Stallions.	15. Highland Ponies.	21. Half-bred.
3. Galloway.	10. Draught Geldings.	16. Shetland Ponies.	22. Shropshire.
4. Highland.	11. Clydesdale Mares and Fillies.	17. Harness Horses.	23. Oxford-Down.
5. Ayrshire.	12. Hunters.	18. Blackface Sheep.	24. Suffolk.
6. Jersey.	13. Hackneys.	19. Cheviot.	25. Swine.
7. Shetland.			

NOTE.—Animals entered as *Extra Stock* may compete for these Medals. Former Winners of the President's Medals are eligible. The Society shall have the right to photograph the Winners for publication in the 'Transactions.' At this Show no animal can be awarded more than one of these Medals.

ENTRY FEES			CLASS	CATTLE	PREMIUMS
Members	Non-Members				

¹ Given by the Shorthorn Society.

² "The Ballindalloch Challenge Cups," value £50 each, are offered for the best Bull of any age and best Cow of any age (Heifers excluded) in the Aberdeen-Angus classes, the former presented by the late Sir George Macpherson Grant, Bart., and the latter by the late Mr C. Macpherson Grant of Drumduan. Each Cup will become the property of the Exhibitor who shall win it five times, not necessarily in succession. The breeder of the successful animals each year will receive the Society's Silver Medal, with suitable inscription.

ENTRY FEES		CLASS		PREMIUMS			
Members	Non-Members			First	Second	Third	Fourth
				£	£	£	£
CATTLE							
AYRSHIRE							
<i>President's Medal for best Ayrshire</i>							
25/-	35/-	25	¹ Cow in Milk, calved before 1909	12	8	4	—
25/-	35/-	26	¹ Cow in Milk, calved after 1st Jan. 1909	10	7	3	—
25/-	35/-	27	¹ Cow of any age in Calf, or Heifer calved in 1909 in Calf and due to calve within nine months after the Show	10	7	3	—
15/-	25/-	28	Heifer calved in 1910	10	5	3	—
15/-	25/-	29	Heifer calved in 1911	8	5	3	—
² Special Prize of £10 for the best Female Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book not later than 1st Jan. 1912.							
15/-	25/-	30	Bull calved before 1910	12	8	4	—
15/-	25/-	31	Bull calved in 1910	10	7	3	—
15/-	25/-	32	Bull calved in 1911	8	5	3	—
Breeder of best Bull of any age in the three Classes—The Silver Medal.							
² Special Prize of £10 for the best Male Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book not later than 1st Jan. 1912.							
5/-	5/-	—	³ Special Milk Yield Class for Cows of the Ayrshire breed three-year-old and upwards, drawn from Classes 25 and 26. First, £6; Second, £3; Third, £1; Fourth, 10s. See Conditions below.*				
TOTAL PRIZE MONEY				£158			

¹ Cows in these Classes must have produced a calf within fifteen months prior to the Show.

² Given by the Ayrshire Cattle Herd-Book Society.

³ Given by Colonel G. J. Fergusson-Buchanan of Auchentorlie.

* *Conditions*.—All animals competing in this Class must also be entered in their respective Classes in the Ayrshire Section and must be registered in the Ayrshire Cattle Herd-Book.

The Prizes will be awarded according to the following scale of points: One point for every 1 lb. of milk. One point for every completed 10 days since calving, deducting the first 40 days. Maximum points for lactation, 7. Four points for every 1 per cent of fat shown on the average of the two milkings. Fractions of lbs. of milk, percentage of fat, and incomplete periods of less than 10 days to be worked out in decimals and added to the total points. Three-year-old cows to be allowed 12 points over and above the total number of points scored by them.

Cows whose milk shows less than an average of 3 per cent of fat on the two milkings will be disqualified.

The animals to be milked dry at 5 P.M. on the Wednesday of the Show, and the milk for the next 24 hours will be taken for the trials.

Mr Howie, Secretary of the Ayrshire Cattle Herd-Book Society, will act as attendant on the Competition, and arrange for the necessary appliances for weighing and testing. Mr Lennox, the Supervisor of the Scottish Milk Records, will assist.

ENTRY FEES		CLASS		PREMIUMS			
Members	Non- Members			First £	Second £	Third £	Fourth £
CATTLE							
JERSEY							
<i>President's Medal for best Jersey Animal</i>							
25/-	35/-	33	Cow, any age	5	3	2	-
25/-	35/-	34	Heifer calved in 1911	5	3	2	-
TOTAL PRIZE MONEY				£20			
SHETLAND							
<i>President's Medal for best Shetland Animal</i>							
15/-	25/-	35	Cow, any age	5	3	2	-
15/-	25/-	36	Heifer calved in 1911	5	3	2	-
TOTAL PRIZE MONEY				£20			
FAT CATTLE							
<i>President's Medal for best Fat Animal</i>							
15/-	25/-	37	Ox, any pure breed or cross, calved after 1st Dec. 1909	5	2	-	-
15/-	25/-	38	Ox, any pure breed or cross, calved after 1st Dec. 1910	5	2	-	-
15/-	25/-	39	Heifer, any pure breed or cross, calved after 1st Dec. 1909	5	2	-	-
15/-	25/-	40	Heifer, any pure breed or cross, calved after 1st Dec. 1910	5	2	-	-
TOTAL PRIZE MONEY				£28			
Total Prize Money for Cattle, £858							

ENTRY FEES			CLASS		PREMIUMS		
Members	Non-Members						
HORSES							
FOR AGRICULTURAL PURPOSES							
DRAUGHT STALLIONS							
President's Medal for best Clydesdale Stallion or Colt							
30/-	40/-	41	Stallion foaled before 1909	20	15	10	4
30/-	40/-	42	Entire Colt foaled in 1909	20	15	10	4
30/-	40/-	43	Entire Colt foaled in 1910	20	12	8	4
22/6	32/6	44	Entire Colt foaled in 1911	15	10	6	4
Breeder of best Male Animal of any age in the four Classes—The Silver Medal.							
2 Fife and Kinross Perpetual Challenge Cup, value £100, for best Clydesdale Stallion in Classes 42, 43, and 44.							
TOTAL PRIZE MONEY				£177			
DRAUGHT GELDINGS							
President's Medal for best Draught Gelding							
22/6	32/6	45	Draught Gelding foaled before 1909	10	5	3	—
22/6	32/6	46	Draught Gelding foaled in 1909	6	4	3	—
22/6	32/6	47	Draught Gelding foaled in 1910	6	4	3	—
TOTAL PRIZE MONEY				£44			
DRAUGHT MARES AND FILLIES							
President's Medal for best Clydesdale Mare or Filly							
30/-	40/-	48	Mare of any age, with Foal at foot	20	12	7	4
22/6	32/6	49	Yeld Mare foaled before 1909	12	9	6	4
22/6	32/6	50	Yeld Mare or Filly foaled in 1909	12	9	6	4
22/6	32/6	51	Filly foaled in 1910	12	9	6	4
22/6	32/6	52	Filly foaled in 1911	12	9	6	4
Best Clydesdale Mare or Filly—Cawdor Challenge Cup, value 50 guineas. See Conditions below. ³							
TOTAL PRIZE MONEY				£167			
Total Prize Money for Draught Horses, £388							

¹ No animal is allowed to compete in more than one Class, except that horses entered in other Classes may also compete in the Jumping and Driving Classes.

² This Cup has been subscribed for by the Counties of Fife and Kinross in commemoration of the Society's first Show at Cupar-Fife in 1912. For this year the Cup is offered for the best Clydesdale Stallion in the one-, two-, and three-year-old Classes, registered in the Clydesdale Stud-Book. The animal winning the Cup must be certified free from hereditary diseases. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner of the Cup on each occasion will receive a miniature replica as a memento of his winning the Cup.

³ This Cup is offered by the Clydesdale Horse Society of Great Britain and Ireland (subject to the conditions of that Society) for the best Clydesdale Mare or Filly registered in the Clydesdale Stud-Book, entered in any of the Draught Horse classes, at the Show at which it may be competed for. The Cup must be won four times by an Exhibitor with different animals (but not necessarily in consecutive years) before it becomes his absolute property. The animal winning this Cup must be certified free from hereditary diseases. The winner of the Cup, other than the absolute winner, shall, before delivery thereof is made to him, give security to the Clydesdale Horse Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. Until the Cup be won outright, the winner on each occasion will receive the Clydesdale Horse Society's Silver Medal as a memento of his winning the Cup.

ENTRY FEES		CLASS	HORSES	PREMIUMS		
Members	Non-Members			First	Second	Third
				£	£	£
22/6	32/6	53	Colt, Gelding, or Filly , foaled in 1911, the produce of thoroughbred Stallions, out of Mares of any breed	10	5	3
22/6	32/6	54	Filly, Mare, or Gelding , for field, foaled in 1910— <i>in hand</i>	10	5	3
22/6	32/6	55	Yeld Mare, Filly, or Gelding , for field, foaled in 1909— <i>in hand</i>	10	5	3
			¹ Best Hunter Filly in the foregoing Classes, registered, with a number, in the Hunter Stud-Book—Champion Gold Medal.			
22/6	32/6	56	Mare or Gelding , foaled before 1908, able to carry 13 st. 7 lb. and over— <i>in saddle</i>	20	10	5
22/6	32/6	57	Mare or Gelding , foaled before 1908, able to carry any weight up to 13 st. 7 lb.— <i>in saddle</i>	15	10	5
22/6	32/6	58	Mare or Gelding , foaled in 1908, able to carry 13 st. 7 lb. and over— <i>in saddle</i>	15	10	5
22/6	32/6	59	Mare or Gelding , foaled in 1908, able to carry any weight up to 13 st. 7 lb.— <i>in saddle</i>	15	10	5
30/-	40/-	60	Hunter Brood Mare , with Foal at foot	15	8	4
			² Special Prize of £15 for the best Hunter bred in Scotland, 4 years old and upwards, shown in Classes 56 and 58.			
			² Special Prize of £5 to the breeder of the animal winning above prize.			
			² Special Prize of £15 for the best Hunter bred in Scotland, 4 years old and upwards, shown in Classes 57 and 59.			
			² Special Prize of £5 to the breeder of the animal winning above prize.			
			³ TOTAL PRIZE MONEY			£206
HACKNEYS						
<i>(All to be shown in hand)</i>						
			<i>President's Medal for best Hackney in Classes 61 to 69</i>			
30/-	40/-	61	Brood Mare , 15 hands and upwards, with Foal at foot, or to foal this season to a registered sire	10	6	4
30/-	40/-	62	Brood Mare , under 15 hands, with Foal at foot, or to foal this season to a registered sire	10	6	4
22/6	32/6	63	Yeld Mare or Filly foaled in 1909	8	5	3
22/6	32/6	64	Filly foaled in 1910	8	5	3
22/6	32/6	65	Filly foaled in 1911	8	5	3
30/-	40/-	66	Stallion foaled in or before 1909, over 15 hands	10	6	4
30/-	40/-	67	Stallion foaled in or before 1909, over 14 and not over 15 hands	10	6	4
22/6	32/6	68	Entire Colt foaled in 1910	8	5	3
22/6	32/6	69	Entire Colt foaled in 1911	8	5	3
			All animals entered in the above Hackney Classes must be			

¹ Given by the Hunters' Improvement Society.² Given by Royal Caledonian Hunt.³ £60 of the above contributed by members of Fife Hunt.

ENTRY FEES		CLASS			PREMIUMS		
Members	Non-Members				First	Second	Third
				HORSES			
				HACKNEYS—continued			
				registered in the Hackney Stud-Book except in Classes 65 and 69, and animals entered in these Classes must be eligible for entry in the Hackney Stud-Book. Entry forms must be accompanied by certificate to this effect from Mr F. F. Euren, 12 Hanover Square, London, W.			
				¹ A Champion Prize of £10, or a Gold Medal of the same value, at the option of the Exhibitor, is offered by the Hackney Horse Society for best Mare or Filly in Hackney or Pony Classes.			
				TOTAL PRIZE MONEY . . .		£160	
				PONIES			
				(Classes 70 to 73 will be judged by Hackney Judges)			
				President's Medal for best Pony			
22/6	32/6	70		Stallion, 3 years old and upwards, 14 hands and under—in hand	5	3	2
22/6	32/6	71		Yeld Mare, Filly, or Gelding, 3 years old and upwards, over 13 and not over 14 hands—in saddle	5	3	2
22/6	32/6	72		Yeld Mare, Filly, or Gelding, 3 years old and upwards, over 12 and not over 13 hands—in saddle	5	3	2
22/6	32/6	73		Yeld Mare, Filly, or Gelding, 3 years old and upwards, 12 hands and under—in hand	5	3	2
				TOTAL PRIZE MONEY . . .		£40	
				² HIGHLAND PONIES			
				President's Medal for best Highland Pony			
22/6	32/6	74		Highland Pony Stallion of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book	5	3	2
22/6	32/6	75		Highland Pony Stallion of the light type, three years old or upwards, not exceeding 14.2 hands, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book	5	3	2
22/6	32/6	76		Highland Pony Entire Colt, foaled after 1st January 1911, entered or eligible for entry in the Highland Section of the Polo Pony Stud-Book	5	3	2

¹ A Mare 6 years old or more must have had a living foal. Winners of the Hackney Society's £10 Prize or Gold Medal in 1912, except at the London and Royal English Shows, excluded. The winner must be entered or accepted for entry in Hackney Stud-Book, and certified free from hereditary disease. This Gold Medal is not redeemable.

² Exhibitors desirous of entering in these Classes Ponies not yet accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book are recommended to communicate with Mr J. H. Munro Mackenzie of Calgary, Isle of Mull, who will advise as to the steps to be taken with a view to the registration of the Ponies. All entries for above Classes must be accompanied by a certificate from Messrs F. H. Badge and L. Collas, Joint-Secretaries to the Polo and Riding Pony Society, 12 Hanover Square, London, W., to the effect that the animals are accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book.

ENTRY FEES		CLASS	HORSES	PREMIUMS			
Members	Non-Members			First	Second	Third	Fourth
				£	£	£	£
HIGHLAND PONIES—continued							
22/6	32/6	77	Highland Pony Mare of the heavy type, 3 years old or upwards, not exceeding 14.2 hands, yeld or with Foal at foot, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book	5	3	2	—
22/6	32/6	78	Highland Pony Mare of the light type, 3 years old or upwards, not exceeding 14.2 hands, yeld or with Foal at foot, entered or accepted for entry in the Highland Pony Section of the Polo Pony Stud-Book	5	3	2	—
22/6	32/6	79	Highland Pony Filly , foaled after 1st January 1910, entered or eligible for entry in the Highland Pony Section of the Polo Pony Stud-Book	5	3	2	—
<i>The Judge shall have power to transfer to the proper Class any animal entered wrongly as to type.</i>							
¹ TOTAL PRIZE MONEY				£60			
SHETLAND PONIES							
<i>(All to be shown in hand)</i>							
<i>President's Medal for best Shetland Pony</i>							
20/-	30/-	80	Stallion , not exceeding 10½ hands, foaled before 1909	5	4	3	2
20/-	30/-	81	Entire Colt , not exceeding 10½ hands, foaled in 1909 or 1910	5	4	3	2
20/-	30/-	82	Mare , not exceeding 10½ hands, with Foal at foot	5	4	3	2
20/-	30/-	83	Yeld Mare , not exceeding 10½ hands	5	4	3	2
20/-	30/-	84	Filly , not exceeding 10½ hands, foaled in 1909 or 1910	5	4	3	2
TOTAL PRIZE MONEY				£70			
² DRIVING COMPETITIONS							
<i>³ President's Medal for best animal in the Classes for Horses in Harness</i>							
22/6	32/6	85	Yeld Mare, Filly, or Gelding , any age, in Harness, 15 hands and upwards, to be driven in the ring	10	5	3	—
22/6	32/6	86	Yeld Mare, Filly, or Gelding , any age, in Harness, 14 hands and under 15 hands, to be driven in the ring	10	5	3	—
22/6	32/6	87	Yeld Mare, Filly, or Gelding , any age, in Harness, under 14 hands, to be driven in the ring	3	2	—	—
TOTAL PRIZE MONEY				£41			
Total for Horses, £965							

¹ The Polo and Riding Pony Society gives £15 towards these prizes.

² Animals entered in other Classes may be entered in the Driving Classes at an additional fee of 6s. if they are eligible.

³ An animal that has won a President's Medal in another section in this Show shall not be eligible to compete for the Medal in this section.

Shed accommodation for machines for Driving Competitions—Members, 5s. ; Non-Members, 10s.

JUMPING COMPETITIONS

SPECIAL REGULATIONS

(See also the Regulations on pages 55 to 61)

1. Jumping Competitions will take place on the afternoons of Wednesday, Thursday, and Friday, the 10th, 11th, and 12th July.
2. Entries for each day's Competitions will close at the Secretary's Office in the Showyard at 6 P.M. on the preceding day.
3. *Entry Fees*.—Wednesday, £1; Thursday and Friday, 10s. for each class.
4. *Accommodation* for jumping horses will be provided as follows: Covered shed in which to stand during the day free of charge; or, on application to the Secretary not less than ten days before the opening of the Show, stalls or loose-boxes will be provided at a charge (in addition to the Entry Fee) of £1 for a stall, and £1, 10s. for a loose-box, which must be paid along with the Entry Fee at the time of application.
5. Horses entered for jumping only need not enter the Showyard till 12 noon on the day of Competition, and may leave the Showyard at 6 P.M. each day.
6. *The Jumps* may consist of Single Hurdle, Gate, Double Hurdle, Wall, and Water Jump, power being reserved by the Society to alter these, as well as the Handicaps, as may be thought desirable.

CLASS		First	Second	Third	Fourth	Fifth
	WEDNESDAY.	£	£	£	£	£
1	Horse or Pony any height	20	15	10	5	3
	THURSDAY.					
2	Horse or Pony any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in Class 1	10	8	5	3	2
	FRIDAY.					
3	Horse or Pony any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in either of Classes 1 or 2—4 inches extra for the winner of the two first prizes in Classes 1 and 2	10	8	5	3	2
	Champion Prize for most points in Prizes with one or more horses in above Classes—First Prize to count five points; Second Prize, four points; Third Prize, three points; Fourth Prize, two points; and Fifth Prize, one point—the money to be evenly divided in the event of a tie	10	—	—	—	—
	Total Prize Money for Jumping, £119					

ENTRY FEES		CLASS	S H E E P BLACKFACE	PREMIUMS			
Members	Non-Members			First	Second	Third	Fourth
			<i>President's Medal for best pen of Blackface Sheep</i>	£	£	£	£
10/-	15/-	88	Tup above one shear	12	8	4	2
10/-	15/-	89	Shearling Tup	12	8	4	2
10/-	15/-	90	Ewe above one shear, with her Lamb at foot	10	5	2	—
10/-	15/-	91	Shearling Ewe or Gimmer	10	5	2	—
			TOTAL PRIZE MONEY	£86			
			CHEVIOT				
			<i>President's Medal for best pen of Cheviot Sheep</i>				
10/-	15/-	92	Tup above one shear	12	8	4	2
10/-	15/-	93	Shearling Tup	12	8	4	2
10/-	15/-	94	Ewe above one shear, with her Lamb at foot	10	5	2	—
10/-	15/-	95	Shearling Ewe or Gimmer	10	5	2	—
			¹ Perpetual Challenge Cup, gifted by Mr Borthwick, value £25, for best Sheep in the Cheviot Classes.				
			TOTAL PRIZE MONEY	£86			
			BORDER LEICESTER				
			<i>President's Medal for best pen of Border Leicesters</i>				
			Tweeddale Gold Medal for best Border Leicester Tup.				
10/-	15/-	96	Tup above one shear	12	8	4	2
10/-	15/-	97	Shearling Tup	12	8	4	2
10/-	15/-	98	Ewe above one shear	10	5	2	—
10/-	15/-	99	Shearling Ewe or Gimmer	10	5	2	—
			² Gold Medal for best animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book.				
			TOTAL PRIZE MONEY	£86			
			HALF-BRED				
			<i>President's Medal for best pen of Half Breds</i>				
10/-	15/-	100	Tup above one shear	12	8	4	2
10/-	15/-	101	Shearling Tup	12	8	4	2
10/-	15/-	102	Ewe above one shear	10	5	2	—
10/-	15/-	103	Shearling Ewe or Gimmer	10	5	2	—
			TOTAL PRIZE MONEY	£86			

¹ Given by the Cheviot Sheep Society.² Given by the Society of Border Leicester Sheep-Breeders.

ENTRY FEES			CLASS		PREMIUMS		
Members	Non-Members	First			Second	Third	
				£	£	£	
SHEEP							
SHROPSHIRE							
President's Medal for best pen of Shropshires							
10/-	15/-	104	¹ Tup above one shear—£6, £4, and £2.				
10/-	15/-	105	Shearling Tup	6	4	2	
10/-	15/-	106	Shearling Ewe or Gimmer	5	3	2	
TOTAL PRIZE MONEY				£24			
OXFORD-DOWN							
President's Medal for best pen of Oxford-Down							
10/-	15/-	107	Shearling Tup	6	4	2	
10/-	15/-	108	Shearling Ewe or Gimmer	5	3	2	
² Best Shearling Oxford-Down Tup in Class 107 bred in Scotland, to be registered in Oxford-Down Flock-Book before prizes will be paid—£5, £3, and £2.							
TOTAL PRIZE MONEY				£22			
SUFFOLK							
President's Medal for best pen of Suffolk Sheep							
10/-	15/-	109	Shearling Tup	6	4	2	
10/-	15/-	110	Shearling Ewe or Gimmer	5	3	2	
10/-	15/-	111	³ Tup Lamb—£5, £3, and £2.				
10/-	15/-	112	³ Three Ewe Lambs, £5, £3, and £2.				
TOTAL PRIZE MONEY				£22			
FAT SHEEP							
10/-	15/-	113	Three Fat Lambs, any breed or cross, dropped in the year of the Show	5	3	2	
Total Prize Money for Sheep, £422							

¹ £10 contributed by Alfred Mansell & Co. towards these Prizes.² Given by Oxford-Down Sheep-Breeders' Association.³ Given by the Suffolk Sheep Society.

ENTRY FEES		CLASS		PREMIUMS		
Members	Non-Members			First	Second	Third
				£	£	£
SWINE						
<i>President's Medal for best pen of Swine</i>						
LARGE WHITE BREED						
10/-	15/-	114	Boar farrowed before 1911	6	3	2
10/-	15/-	115	Boar farrowed in 1911	6	3	2
10/-	15/-	116	Boar farrowed in 1912	4	2	1
10/-	15/-	117	Sow farrowed before 1911	6	3	2
10/-	15/-	118	Sow farrowed in 1911	6	3	2
10/-	15/-	119	Sow farrowed in 1912	4	2	1
TOTAL PRIZE MONEY				£58		
MIDDLE WHITE BREED						
10/-	15/-	120	Boar, any age	4	2	—
10/-	15/-	121	Boar farrowed in 1912	4	2	—
10/-	15/-	122	Sow, any age	4	2	—
10/-	15/-	123	Sow farrowed in 1912	4	2	—
TOTAL PRIZE MONEY				£24		
BERKSHIRE						
10/-	15/-	124	Boar, any age	4	2	—
10/-	15/-	125	Boar farrowed in 1912	4	2	—
10/-	15/-	126	Sow, any age	4	2	—
10/-	15/-	127	Sow farrowed in 1912	4	2	—
TOTAL PRIZE MONEY				£24		
Total Prize Money for Swine, £106						

EXTRA STOCK

Animals not included in the Classes for Competition may be exhibited as Extra Stock, and may receive Awards as follows:—Very Highly Commended, or Highly Commended, carrying the Medium Silver Medal; or Commended, for which the Bronze Medal is given.

Animals entered as Extra Stock are eligible to compete for the President's Medals, whether former winners of these Medals or not.

Entry fees—same as corresponding Classes.

POULTRY

First Premium—ONE SOVEREIGN; *Second Premium*—TEN SHILLINGS. In each Class in which there are six or more pens competing, a Third Prize of Five Shillings may be awarded, provided there is sufficient merit in the pens. Three or more Commendations may also be given—thus, Very Highly Commended, Highly Commended, and Commended.

Champion Medals are offered as follows:—

- | | |
|--------------------------------|-------------------------|
| 1. Best Cock, any Variety. | 5. Best Pen of Ducks. |
| 2. Best Hen, any Variety. | 6. Best Pen of Geese. |
| 3. Best Cockerel, any Variety. | 7. Best Pen of Turkeys. |
| 4. Best Pullet, any Variety. | |

Aged Birds must have been hatched previous to, and Cockerels and Pullets in, the year of the Show.

Entry Fees—Members, 2s.; Non-Members, 3s.

DORKING—	Class	LANGSHAN	Class
<i>Coloured</i>	1. Cock	39. Cock	
	2. Hen	40. Hen	
	3. Cockerel	41. Cockerel	
	4. Pullet	42. Pullet	
<i>Silver Grey</i>	5. Cock	ORPINGTON—	
	6. Hen	<i>Black</i>	43. Cock
	7. Cockerel		44. Hen
	8. Pullet		45. Cockerel
BRAHMAFOOTRA or COCHIN-			46. Pullet
CHINA	9. Cock	<i>Buff</i>	47. Cock
	10. Hen		48. Hen
	11. Cockerel		49. Cockerel
	12. Pullet		50. Pullet
SCOTCH GREY	13. Cock	<i>Any other Variety</i>	51. Cock
	14. Hen		52. Hen
	15. Cockerel		53. Cockerel
	16. Pullet		54. Pullet
HAMBURG—		WYANDOTTE—	
<i>Black</i>	17. Cock	<i>Gold or Silver</i>	55. Cock
	18. Hen		56. Hen
<i>Any other Variety</i>	19. Cock		57. Cockerel
	20. Hen		58. Pullet
<i>Any Variety</i>	21. Cockerel	<i>Black or White</i>	59. Cock
	22. Pullet		60. Hen
PLYMOUTH ROCK	23. Cock		61. Cockerel
	24. Hen		62. Pullet
	25. Cockerel	<i>Any other Variety</i>	63. Cock
	26. Pullet		64. Hen
MINORCA	27. Cock		65. Cockerel
	28. Hen		66. Pullet
	29. Cockerel	INDIAN GAME	67. Cock
	30. Pullet		68. Hen
LEGHORN—		GAME—	
<i>White</i>	31. Cock	<i>Old English</i>	69. Cock
	32. Hen		70. Hen
	33. Cockerel	<i>Modern</i>	71. Cock
	34. Pullet		72. Hen
<i>Any other Variety</i>	35. Cock	<i>Indian and Old English</i>	
	36. Hen	<i>Game</i>	73. Cockerel
	37. Cockerel		74. Pullet
	38. Pullet		

BANTAM—	Class
<i>Game, any Variety, including Old English and Indian Game</i>	75. Cock
	76. Hen
<i>Any other Variety Bantam</i>	77. Cock
	78. Hen
ANY OTHER RECOGNISED BREED OF POULTRY.	79. Cock
	80. Hen
	81. Cockerel
	82. Pullet

TABLE FOWLS—	
<i>Any Breed or Cross, to be judged solely as Table Fowls, and without regard to fancy points</i>	83. { Pair of Cockerels
	84. { Pair of Pullets

DUCKS—	Class
<i>Aylesbury.</i>	85. Drake
	86. Duck
	87. { Drake (Young)
	88. { Duck (Young)
<i>Rouen</i>	89. Drake
	90. Duck
<i>Any other Variety</i>	91. Drake
	92. Duck
<i>Any Variety (Aylesbury excepted)</i>	93. { Drake (Young)
	94. { Duck (Young)
GEESE.	95. Gander
	96. Goose
TURKEYS	97. Cock
	98. Hen

AMOUNT OF POULTRY PREMIUMS, £171, 10s.

DAIRY PRODUCE

No Exhibitor to show more than one lot in any Class.

Entry Fees—Members, 4s.; Non-Members, 6s.

Class	Premiums.		
	1st.	2nd.	3rd.
1. Powdered Butter, not less than 7 lb.	£ 4	£ 2	£ 1
2. Fresh Butter, three 1-lb. rolls	£ 4	£ 2	£ 1
3. Cheddar Cheese, 56 lb. and upwards—£6, £4, £2, and £1			£14
4. Sweet-Milk Cheese, flat shape, white in colour, made according to the Dunlop or other method—£3, £2, £1.			13
			6
			£38

HORSE SHOEING

Open to Shoeing-Smiths from any part of the United Kingdom.

Horses provided for this Competition cannot be entered in any other Class.

Class I. FARM or WORK HORSES.—*Thursday*, at 10 A.M.

Prizes: 1st, £3; 2nd, £2; 3rd, £1.

Class II. HARNESS HORSES.—*Friday*, at 10 A.M.

Prizes: 1st, £3; 2nd, £2; 3rd, £1.

1. Entries must be made with the SECRETARY not later than 31st May. Entry Fee, 2s. 6d. for each Class. Entry Forms may be had on application.
2. The Competition will take place in the Showyard, and will be decided by points, time being taken into consideration. Each Competitor must make and fix one fore and one hind shoe, having previously taken off the old shoes, and must bring his own tools, nails, and a striker. The striker will not be allowed to touch the horse's hoof. The Local Society will provide forges, anvils, flat iron, and fuel. The horses to be shod will be provided by the Local Society. Forges and horses will be balloted for.
3. Any Competitor who does not attend at the Horse-Shoeing Stance and answer to his name at 10 A.M. on the day on which he is entered for competition, will be debarred from competing.
4. The Competitor and his striker will be admitted to the Yard free of charge on the day of Competition on presentation of tickets which will be sent to the Competitor for the purpose.

ABSTRACT OF PREMIUMS.

(25 Champion Medals given by THE RIGHT HON. LORD NINIAN CRICHTON-STUART, M.P.)

GIVEN BY THE SOCIETY.

1. Cattle	£858 0 0
2. Horses	965 0 0
3. Jumping	119 0 0
4. Sheep	422 0 0
5. Swine	106 0 0
6. Poultry	171 10 0
7. Dairy Produce	33 0 0
8. Horse-Shoeing	12 0 0
9. Medals to Breeders, &c.	20 0 0
10. Prizes for Timber ¹	20 0 0
	£2726 10 0
Less Private Subscriptions	75 0 0
Given by the Society	£2651 10 0

CONTRIBUTED PRIZES.

1. The Shorthorn Society	£40 0 0
*2. The late Sir George Macpherson Grant, Bart.	50 0 0
*3. The late Mr C. Macpherson Grant of Drumduan	50 0 0
4. Aberdeen-Angus Cattle Society	10 0 0
5. Ayrshire Cattle Herd-Book Society	20 0 0
6. Colonel G. J. Fergusson-Buchanan	10 10 0
*7. Fife and Kinross Perpetual Challenge Cup	100 0 0
*8. Cawdor Challenge Cup	52 10 0
9. Hunters' Improvement Society	10 0 0
10. Members of Fife Hunt	60 0 0
11. Royal Caledonian Hunt	40 0 0
12. Hackney Horse Society	10 0 0
13. Polo and Riding Pony Society	15 0 0
*14. Borthwick Challenge Cup	25 0 0
15. Society of Border Leicester Sheep-Breeders	10 0 0
16. Alfred Mansell & Co.	10 0 0
17. Oxford-Down Sheep-Breeders' Association	10 0 0
18. Suffolk Sheep Society	20 0 0
19. Tweeddale Gold Medal	16 0 0
	559 0 0
	£3210 10 0

¹ Grant to Royal Scottish Arboricultural Society for Prizes for Timber.

* Challenge Prizes.

JOHN MACDIARMID, *Interim Secretary.*GEORGE IV. BRIDGE,
EDINBURGH, March 1912.

The Society's Show for 1913 will be held at Paisley
on the 8th, 9th, 10th, and 11th July.

MEMBERS ADMITTED SINCE THE LIST WAS PUBLISHED IN 1911.

ARRANGED ACCORDING TO SHOW DISTRICTS.

ELECTED 7TH JUNE 1911 AND 10TH JANUARY 1912.

1.—GLASGOW DISTRICT.

ARGYLL.

Admitted

1911 Smith, Gilbert K., Benbuie, Lochbuie,
Mull.

AYR.

1912 Dunlop, G., Gameshill, Stewarton.
1912 Jack, M. W., Broadstone, Beith.
1912 Kerr, David, Marshalland, Beith.
1912 Knox, William, of Moorpark, Kilbirnie,
Ayrshire.
1912 Smith, R., Middleton, Dunlop.
1912 Stewart, John, Waterland, Lugton.
1912 Wallace, David, Auchenbrain, Mauch-
line.
1912 Wilson, William, Auchencloigh, Ochil-
tree.

LANARK.

1912 Bathgate, Harry S., Woodneuk, Mount
Vernon, Glasgow.
1912 Chrystal, Alex. Graham, 82 St Vincent
Street, Glasgow.
1912 Colquhoun, Jno., Corkerhill Farm, by
Govan.
1912 Crosse, Archibald, 19 Hope Street,
Glasgow.
1912 Denholm, Thomas, Greenhill, Cleland.
1912 Donald, James, East Parkhead, Bells-
hill.
1912 Fleming, James, Townhead, Hamilton.
1912 Gray, Wm. H., Kelvinside Chemical
Co., Maryhill.
1912 Hogg, Thomas, 19 Hope Street, Glas-
gow.
1912 Macdonald, John, 72 Great Clyde Street,
Glasgow.
1912 Meiklejohn, A. M., Peel Cottage,
Uddingston.
1912 Muirhead, Andrew, Cloverhill Farm,
Glasgow (West).
1912 Russell, James, Townhead, Holytown.
1912 Speir, John, Newton Farm, Newton,
Glasgow.
1912 Veitch, William, Drumry, Drumchapel.
1912 Weir, John, Shottsburn, Salsburgh.

RENFREW.

1912 Allan, Bryce, The Cliff, Wemyss Bay.
1912 Andrew, James, 26 St James Street
Paisley.
1912 Andrews, John, Cardonald Mills, Paisley.
1912 Barclay, George, Thornhill, Johnstone.
1912 Barr, James H., Dairyman, Sandholes,
Paisley.
1912 Blair, Arthur H., East Yonderton,
Bridge of Weir.
1912 Howie, Matthew, Blackbyres, Barr-
head.
1912 Brown, John Francis, Moredun, Paisley.
1912 Burns, James, Drygate, Kilbarchan.
1912 Caldwell, James, East Braes, Kilbar-
chan.
1912 Caldwell, William, Ward, Kilbarchan.
1912 Coats, Daniel, 5 Garthland Place,
Paisley.
1912 Coats, James, jun., of Ferguslie, Paisley.
1912 Crawford, James, Botherwickfield, Hous-
ton.
1912 Douglas, John, Barfillan, Houston.
1912 Dyer, Robert, Nether Johnstone, John-
stone.
1912 Finlayson, Archibald Watson, Merchis-
ton House, Johnstone.
1912 Forrest, William, Chain Road, Paisley.
1912 Galloway, George, Estate Factor,
Bishopton.
1912 Gardner, James, South Hillington,
Paisley.
1912 Gardner, John, Woodend, Houston.
1912 George, William, Rossland, Bishopton.
1912 Gibb, John, Gledstane, Bishopton.
1912 Gilmour, Matthew, Town of Inchinnan,
Inchinnan.
1912 Henderson, William, Old Crookston,
Nitshill.
1912 Howie, William, Bank Street, Greenock.
1912 Kerr, John, jun., Duchal Mains, Kil-
malcolm.
1912 Kerr, Robert, Erakine Home Farm,
Bishopton.
1912 Kerr, William, Neilston, Neilston.
1912 Kerr, W. J., Mid Walkinshaw, Ren-
frew.
1912 Kyle, Robert, Leigh Park, Paisley.
1912 Kyle, Robert, South Candren, Paisley.

- 1912 Laird, John, Ladymuir, Kilbarchan.
 1912 Lang, William, 4 Glen Lane, Paisley.
 1912 Lawrie, Robert, 77 New Sneddon Street, Paisley.
 1912 Lobnitz, Fred., Ross Hall, Crookston.
 1912 Lyle, Hugh, Barrangary, Bishopston.
 1912 Lyle, John, Dairyman, Lawn St., Paisley.
 1912 Lyle, Robert, West Porton Farm, Bishopston.
 1912 M'Dougall, W. G., 94 High Street, Paisley.
 1912 M'Indoe, James, Park Dairy, Underwood Lane, Paisley.
 1912 Mackean, William Muir, Inverker, Paisley.
 1912 M'Kendrick, William, Craigends, Denistoun, Kilmalcolm.
 1912 Macintosh, Alexander, Greenhill, Houston.
 1912 Macleannan, H. B., Ardgryffe, Johnstone.
 1912 M'Pherson, Donald, Shillingworth, Bridge of Weir.
 1912 Middlemas, Robert C., Auchensaives, Milliken Park.
 1912 Miller, James, Castlehill, Port Glasgow.
 1912 Moffat, David, 31 St Vincent Place, Glasgow.
 1912 Moffat, James, Freeland, Inchinnan.
 1912 Murray, R., jun., Pacemuir Mill, Kilmalcolm.
 1912 Park, Alexander, jun., Turningshaw, Houston.
 1912 Rankin, James, Netherton, Paisley.
 1912 Rennie, John, 26 Neillston Road, Paisley.
 1912 Renshaw, C. S. Bine, of Clippens, Johnstone.
- 1912 Riddell, Robert, Blackhall, Paisley.
 1912 Rowand, John, Candren, Paisley.
 1912 Samson, James, Glenshinnoch, Bishopston.
 1912 Samson, John, Drumcross Farm, Bishopston.
 1912 Scott, Alexander, North Mains, Johnstone.
 1912 Sharp, John, Clippens, Johnstone.
 1912 Snodgrass, Matthew, Old Mains, Inchinnan.
 1912 Stevenson, David William, Johnstone.
 1912 Stevenson, James, Wardend, Milliken Park, Paisley.
 1912 Stewart, William, Mossland, Renfrew.
 1912 Stirrat, Robert, Blackstone Holme Farm, Paisley.
 1912 Taylor, Thomas, Moss-side, Paisley.
 1912 Turner, William, Loanhead, Houston.
 1912 White, Thomas, Fullwood, Johnstone.
 1912 Whyte, Hugh, Nether Craigends, Johnstone.
 1912 Williamson, James, Hartfield Lodge, Paisley.
 1912 Williamson, Robert, Penwold, Bridge of Weir.
 1912 Wilson, Alexander, Thornly Park Farm, Paisley.
 1912 Wilson, James, Manswrae, Bridge of Weir.
 1912 Wilson, Thomas, Jaapston, Neillston.
 1912 Young, James L., 41 Gordon Street, Paisley.
 1912 Young, R. S., Auchans, Johnstone.
 1912 Young, William N., Fulwood Mains, Johnstone.

2.—PERTH DISTRICT.

FIFE.

- 1911 Aird, John, Balbeardie Farm, Kirkcaldy.
 1911 Ashton, Harry B., Corn Merchant, Cupar.
 1912 Baillingal, Robert, Balgonie Estate Office, Markinch.
 1912 Barus, George, Saddler, Kirkcaldy.
 1911 Bonthronne, David, Newton of Falkland, Falkland, Fife.
 1911 Brunton, J. N., National Bank, Cupar-Fife.
 1911 Cameron, James, Gilston Mains, Largo.
 1912 Cook, David, Clydesdale Bank House, Anstruther.
 1911 Crichton, James B., of Luthriebank, Cupar-Fife.
 1911 Currie, Miss Evelyn Thomson, Trynlaw, Cupar-Fife.
 1912 Davie, James, Blacksmith, Kirkcaldy.
 1912 Dickie, Alexander N., Devon, Kennoway.
 1912 Dickie, James N., Devon, Kennoway.
 1911 Donaldson, George, Road Surveyor, Craigvors, Kirkcaldy.
 1911 Donaldson, George, Wood Merchant, Leven, Fifeshire.
 1911 Donaldson, James, Mansfield, Tayport, Fifeshire.
 1912 Duncan, Alexander, Dunshalt, Auchtermuchty.
 1911 Erskine, T. H., Grangemuir, Pittenweem.
 1912 Ferlie, Thomas, Provost of Auchtermuchty.
 1912 Grieve, Angus, Ladybank.
- 1911 Grosart, John A., Randolph Street, Dunfermline.
 1912 Heggie, Robert, Birks, Scotlandwell, Leslie.
 1911 Hogarth, John, Flour Mills, Kirkcaldy.
 1911 Houston, David, Hillside Cottage, Cupar-Fife.
 1912 Lawson, Wm. H., Firthfield, Anstruther.
 1911 M'Laren, David, 16 Millhill St., Dunfermline.
 1912 Marr, Rev. Edward, Tillyhilt, Kirkcaldy.
 1912 Muirhead, Andrew, Leckiebank, Auchtermuchty.
 1911 Nairn, R. Spencer, Barham, Springfield, Fifehire.
 1912 Park, M., Butcher, Kirkcaldy.
 1911 Reid, David, Cruivie, Wormit, Fifehire.
 1911 Reid, Robert, M.R.C.V.S., Millgate, Cupar-Fife.
 1912 Reid, Thomas William, West Hall, Cupar.
 1912 Robertson, , Walton, Auchtertool.
 1911 Robertson, William, Tontine Hotel, Cupar-Fife.
 1912 Scott, John, Balone, St Andrews.
 1912 Sinclair, Thomas, Leuchatsbeath, Cowdenbeath.
 1911 Small, John, Auctioneer, Cupar-Fife.
 1911 Smith, Andrew, Balmalcolme, Kingskettle.
 1911 Smith, D. D., Seedsman, Cupar-Fife.
 1911 Stewart, William, Lumphinnans Farm, Cowdenbeath.
 1911 Struthers, James, Coates Farm, Largo, Fifehire.
 1911 Thomson, William, Heather Inch, Ladybank.

- 1912 Tullis, George, George Hotel Stables,
Kirkcaldy.
1912 Turnbull, W., Newton, Auchtertool.
1911 Walker, James, Garvock, Dunfermline.
1911 Watt, James, Middlefield, Cupar-Fife.
1912 Wilkie, John, Balgreggie, Dysart.
1912 Whyte, William, Gilliesfaulds, Cupar.

FORFAR.

(WESTERN DIVISION.)

- 1912 Fenton, David, Gask, Coupar-Angus.
1912 White, R. G., B.Sc., Kirkton, Forfar.

KINROSS.

- 1911 Beveridge, William, Kinross.
1912 Montgomery, Sir Basil Graham, of
Stanhope, Bart., Kinross House,
Kinross.

PERTH.

(PERTH SHOW DIVISION.)

- 1912 Chisholm, William, Perth District
Asylum, Murthly.
1911 Doune, Lord, Kinfauns Castle, Perth.
1912 Greig, Alexander, Estate Office, Dupplin
Castle, Perth.
1912 Macdiarmid, Hugh, Camusericht, Ran-
noch Station.
1911 Macrae, Rev. Duncan, U.F.C. Manse
Locheearnhead.
1912 Millar, David, The Brae, Alyth.
1912 Murray, Archibald P., Logie House,
Logiealmond.
1912 Rose, William, Haugh of Ballechin,
Ballinluig.

3.—STIRLING DISTRICT.

DUMBARTON.

- 1912 Kinloch, James, Ardoch, Cardross.
1912 M'Farlane, Robert, Tullick, Arrochar.

PERTH.

(STIRLING SHOW DIVISION.)

- 1912 Dron, John, Esselmont, Crieff.
1911 Finlayson, Malcolm, Solicitor, Crieff.

4.—EDINBURGH DISTRICT.

EDINBURGH.

- 1911 Bradley, O. Charnock, M.R.C.V.S.,
M.D., D.Sc., Principal Royal (Dick)
Veterinary College, Edinburgh.
1912 Burns, James Steven, S.S.C., 61 North
Castle St., Edinburgh.
1911 Douglas, Thomas (W. J. Robertson
& Co., Ltd.), Waverley Oil Works,
Fountain Place, Edinburgh.
1911 Dundas, Sir Henry, Bart., Polton House,
Lasswade.
1912 Fyfe, John W., 64 Polwarth Terrace,
Edinburgh.
1911 Glover, James Y., 31 Albany Street,
Edinburgh.

- 1911 Shiell, Alexander Guthrie, Advocate,
4 Duke St., Edinburgh.
1912 Steele, James Torrance, B.Sc., College
of Agriculture, 13 George Sq., Edin-
burgh.

HADDINGTON.

- 1912 Shields, James B., jun., Longniddry.
1912 Smith, James K., Leaston, Upper Keith.

LINLITHGOW.

- 1911 Cadell, Lieut-Col. J. M., Indian Medical
Service, Foxhall, Kirkliston.
1911 Cadzow, John, Glendevon, Winchburgh.

5.—ABERDEEN DISTRICT.

ABERDEEN.

- 1912 Bell, Alexander A., Whitewell, Tyrie,
Fraserburgh.
1911 Burnett, Miss J., Glamis Cottage, Spittal,
Aberdeen.
1912 Calder, Rev. James Jolly, E.C. Manse,
Cairnie, Huntly.
1912 Coats, George, Forest of Glen Tanar,
Aboynae.
1911 Copland, Adam, 8 Merkland Road,
Aberdeen.
1912 Diack, William, Knockollocky, Pitcaple.
1911 Murray, Alexander M., Aberdeen Com-
mercial Co., Ltd., Aberdeen.

BANFF.

- 1911 Donald, George, jun., Ladyhill, Keith.
1912 Forbes, Charles, Upper Dalachy, Banff.

- 1912 Gray, William, Mill of Park, Cornhill,
Banff.
1911 Hay, George Petrie, Mid Street, Keith.
1912 Maconochie, John, Broomhead, Duff-
town, Banffshire.
1911 Shepherd, Alexander, Craibstone, Desk-
ford, Cullen.
1911 Wilson, Walter, Inchgower, Buckie,
Banffshire.

FORFAR.

(EASTERN DIVISION.)

- 1911 Blair - Imrie, Hew, Lunan House,
Montrose.
1912 Duff, John, Leys of Dun, Bridge of Dun.
1912 Grant, Hugh, Clochie, Edzell.
1911 Shanks, James, Dens Iron Works,
Arbroath.

6.—DUMFRIES DISTRICT.

DUMFRIES.

- 1912 Johnstone, George, Gushhead, Wam-
phray.
1911 Smith, Fred. J., Corsebank, Sanquhar.

KIRKCUDBRIGHT.

- 1912 Shepley - Shepley, Robert, Troquhain,
Balmacellan.

7.—INVERNESS DISTRICT.**CAITHNESS.**

- 1912 Barnettson, James, Claycock House, Halkirk, Caithness.
 1911 Barnettson, Wm. A., Claycock House, Halkirk, Caithness.
 1911 Begg, Donald, Brims Mains, Forres, Thurso.
 1912 Davidson, J. H. M., Buckies, Halkirk, Caithness.
 1911 Dunnett, Andrew, Lythmore, Thurso.
 1911 Gunn, James William, Sibster, Wick.
 1911 Gunn, John S., Sibster, Wick.
 1911 Mackay, George M., Steam Mills, Wick.
 1911 Mackay, Ralph W., Dunbeath Mains, Dunbeath, Caithness.
 1912 Mowat, John A., Auctioneer, Lybster, Caithness.
 1911 Murray, Donald C., Castletown, Caithness.
 1911 Nicol, William, 25 Princes Street, Thurso.
 1912 Oliver, John, 20 Princes Street, Thurso.
 1911 Purves, James, Thurdistoft, Castletown, Caithness.
 1912 Robertson, J. J., Bridge Street, Wick.
 1911 Sinclair, A. F., Achinabest, Reay, Caithness.

ELGIN.

- 1911 Allan, William, Level, Longmorn, Elgin.
 1911 Anderson, Alexander, Morriston, Elgin.
 1911 Anderson, James, Stonewells, Urquhart, Morayshire.
 1911 Anderson, Wm., Mains of Burgie, Forres.
 1911 Baxter, Capt. Clement, M.R.C.V.S., Elgin.
 1911 Brodie of Brodie, Brodie Castle, Forres.
 1911 Bruce, John William, Bogs of Blervie, Forres.
 1911 Collie, W. H., Muirhead, Kinloss, Forres.
 1911 Ferrie, W. B., Home Farn, Kinloss, Forres.
 1911 Fernier, John, The Riach, Longmorn, Elgin.
 1911 Forbes, Thomas, B., Altyre Estates Office, Forres.
 1911 Forsyth, John, Barmuckity, Elgin.
 1911 Forsyth, John M., Haughland, Elgin.
 1911 Fraser, Louis Grant, Westerfolds, Duffus, Elgin.
 1911 Galloway, Capt. H. B., of Blervie, Forres.
 1911 Grant, Allan, Wester Alves, Forres.
 1912 Grant, John S., Easter Gallovie, Dulan Bridge.
 1911 James, Robert, jun., Laurenceton, Forres.
 1911 Knight, Alexander, Longhill, Lhanbryde.
 1911 Laing, William, Burnstack Dunphail, Forres.
 1911 M'Connachie, James, Muirside, Brodie.
 1911 Macdonald, James, Byres, Fochabers.
 1911 Mackenzie, William, Home Farm, Newton, Elgin.
 1911 M'Lean, Alexander, Corgyle Mains, Carron, Morayshire.
 1911 MacWilliam, Ralph S., Stoneytown, Mulben.
 1911 Marshall, Robert, Dundurcas, Rothies.
 1911 Mavor, John, Earnside, Alves, Forres.
 1911 Munro, James H., Implement Maker, Forres.
 1911 Murdoch, Douglas M., Heldonside, Pluscarden, Elgin.
 1911 Murdoch, John, Burnside, Birnie, Elgin.
 1911 Mustard, John, Easter Cloveses, Duffus, Elgin.

- 1911 Petrie, George, Rosehaugh, New Spynie, Elgin.
 1911 Robertson, Charles G., Tullochgribban, Grantown-on-Spey.
 1912 Robertson, J., Tullochgribban, Grantown-on-Spey.
 1911 Robertson, John, Brodieshill, Alves, Forres.
 1911 Ross, Simon, Coltfoot, Alves, Forres.
 1911 Rutherford, George W., M.R.C.V.S., Forres.
 1911 Samson, D. T., Seafield Estates Office, Elgin.
 1911 Scott, Dr R. B., Manbeen, Elgin.
 1911 Sharp, William, Rothies.
 1911 Stewart, James, Kirkhill, Rothies.
 1911 Strathdee, William, Allarburn, Elgin.
 1911 Taylor, John, Unthank, Duffus.
 1911 Thomson, Alex. of Burgie, Forres.
 1911 Thomson, James, Glasgreen, Elgin.
 1911 Tulloch, John, New Forres, Forres.
 1911 Wattie, Wm. K., Wester Kintrae, Elgin.
 1911 Yool, Wm. M., Calcots, Elgin.

INVERNESS.

- 1911 Alexander, William, Milton of Culloden, Inverness.
 1912 Burr, William, Highland Agricultural Co., Ltd., Inverness.
 1912 Cameron, Donald (D. Petrie, Cameron & Co.), Zetland Villa, Inverness.
 1912 Campbell, Archd., Factor, Raasay, Portree.
 1911 Clark, Donald, Woodlands, Gollanfield.
 1911 Cruickshank, T. M., Lovat Estates Office, Beaulieu.
 1911 Cruickshank, W. J. T., Lovat Estates Office, Beaulieu.
 1911 Dewar, Hugh R., Teanacoll, Beaulieu.
 1911 Fraser, Alex., Union Street, Inverness.
 1911 Fraser, Alexander, Balblair, Gollanfield, Inverness.
 1911 Fraser, Charles, Mains of Gollanfield, Gollanfield, Inverness.
 1911 Fraser, Ian, Ballachraggan, Beaulieu.
 1911 Fraser, James, Wester Laings, Daviot, Inverness.
 1911 Fraser, Malcolm, Rhevackin, Kiltarlity, Beaulieu.
 1912 Fraser, Simon, Ness-side, Inverness.
 1911 Fraser, Thomas, Keppoch Farm, Arisaig.
 1911 Fraser, William, Farraline Mains, Errogie, Inverness.
 1911 Gallon, George, Falcon Square, Inverness.
 1911 Grant, R. B., Lovat Estates Office, Beaulieu.
 1912 Gray, J. T., Halewood, Crown Drive, Inverness.
 1911 Grigor, William, The Millburn Distillery, Inverness.
 1912 Jack, E. C., Exchange, Inverness.
 1911 Jessiman, Alexander, Farm Manager, District Asylum, Inverness.
 1911 Laurie, G. R., jun., Mains of Daviot, Inverness.
 1912 M'Andie, T., The Plough Inn, East Gate, Inverness.
 1911 M'Culloch, James Duff, Essich, Inverness.
 1911 Macdonald, Angus, 47 Eastgate, Inverness.
 1911 Macdonald, George, 4 Hamilton Street, Inverness.

1911 Macdonald, James, Homewood, Inverness.
 1911 Macdonald, John, jun., Homewood, Inverness.
 1911 Macdonald, Malcolm, Albert Bar, Inverness.
 1912 MacEwen, Gibert M., 60 High Street, Inverness.
 1911 MacGillivray, Thomas, Hamilton Street, Inverness.
 1911 MacGrath, Francis, Beauly.
 1911 Mackay, Ian, Solicitor, Inverness.
 1911 Mackenzie, John, 16 Union Street, Inverness.
 1911 Mackenzie, T. C., M.D., F.R.C.P., District Asylum, Inverness.
 1911 Macintosh, N. D., of Raigmore, Inverness.
 1911 Macintosh, Angus, of Holme, Inverness.
 1911 Macintosh, John, Dalnavert, Aviemore.
 1912 M'Intosh, John, Glenholme, Inverness.
 1911 Macintosh, Lachlan, Balvonie, Daviot, Inverness.
 1911 Macintosh, Robert L., Hill House, Inverness.
 1912 M'Intyre, John A., South Laggan, Invergarry.
 1911 Maclean, A., Phopachy, Inverness.
 1911 Maclean, Donald, Teafish, Beauly.
 1911 MacLennan, John, 18 Inglis Street, Inverness.
 1911 M'Naughton, John A., Kinloid Farm, Arisaig.
 1911 Macpherson, James, Charleston, Inverness.
 1911 Macpherson, James, Corrimony, Glen Urquhart, Inverness.
 1912 Macpherson, Lachlan Fowke Hussey, of Corrimony, Glen Urquhart, Inverness.
 1912 Macrae, Allan, Cullernie, Culloden, Inverness.
 1912 MacRae, Duncan A., Tomich House, Beauly.
 1911 Malcolm, Edward Ellice, W.S., Fort William.
 1911 Mearns, Alexander, Shore St., Beauly.
 1912 Munro, Charles, Upper Muckovie, Inverness.
 1911 Munro, John, Milton, Gollanfield.

1911 Noble, John, Mains of Bunachton, Inverness.
 1911 Noble, Thomas, Aldourie Estates Office, Doras, Inverness.
 1911 Paterson, Kenneth, Cantrybruch, Croy, Inverness.
 1912 Petrie, David (D. Petrie, Cameron & Co.), Taybank, Inverness.
 1911 Puntton, James, Tealaggan, Kirkhill, Inverness.
 1911 Reid, Robert G., Castle Stuart, Dalcross, Inverness.
 1911 Robertson, Wm. Fraser, Aberchaldar Farm, Invergarry.
 1911 Rose, John, Hilton, Inverness.
 1911 Ross, Errington (Macrae & Dick), Postmasters, Inverness.
 1912 Ross, Robert, Gellions Hotel, Inverness.
 1911 Skinner, A. W., Redhill, Allanfean, Inverness.
 1911 Smith, Howard H. (A. Robertson & Co.), 37 Union Street, Inverness.
 1911 Sutherland, John R., Solicitor, Inverness.
 1912 Williams, E. J. N., of S. Electric Works, Waterloo Place, Inverness.
 1911 Williamson, John, 3 Stephen's Brae, Inverness.

NAIRN.

1911 Arnott, John M., Wester Clune, Lethen, Nairn.
 1911 Beaton, James S., Saddler, Nairn.
 1911 Brodie, Capt. E. J., of Lethen, Nairn.
 1911 Campbell, Angus M., Budgate, Cawdor, Nairn.
 1911 Gordon, Thomas, Auchnacloich, Nairn.
 1911 Johns, W. Wilton, M.D., Ramleh, Nairn.
 1911 Leven and Melville, Earl of, Glenferness, Nairn.
 1912 M'Intosh, James, Keppernach, Ardclach, Belivat, Nairn.
 1911 Munro, William, Factor, Glenferness, Nairn.
 1911 Reid, John S., Milton of Kilravock, Cawdor, Nairn.
 1911 Taylor, Alexander, Fornightly, Lethen, Nairn.

ORKNEY AND SHETLAND.

ORKNEY.

1911 Clark, George, Keirfield, Sandwick, Orkney.
 1912 Horne, Robert Strong, West Brough, Sanday, Orkney.
 1912 Mackie, James, M.A., B.Sc., 17 Palace Street, Kirkwall.

SHETLAND.

1911 Budge, James, Bigton House, Levenwick, Shetland.

1911 Craigie, James J., Ordale, Baltasound, Shetland.
 1911 M'Dougall, W. Laidlaw, Estate Office, Sumburgh, Shetland.
 1912 Mackay, William John, Castlepark, Lerwick.
 1911 Sandison, J. E., Mandeville, Uyasound, Shetland.
 1911 Umphray, Wm. Hay, Reawick, Shetland.
 1911 Wilson, Robert, of Squarefield, Baltasound, Shetland.

ROSS AND CROMARTY.

1911 Brown, John, F.R.C.V.S., Invergordon.
 1912 Brown, Neil, Applecross, Kyle of Lochalsh.
 1911 Brown, William, Muirhead, Cromarty.
 1912 Caie, J. M., M.A., B.Sc., High Street, Dingwall.
 1912 Cameron, A., Downie, Edderton.

1911 Cameron, James, Balnakyle, Munlochry.
 1911 Campbell, Colin, Shiel House, Glenshiel, Ross-shire.
 1911 Campbell, William, Balnabean, Conon Bridge.
 1911 Chisholm, Kenneth, Dreim, Muir of Ord.
 1911 Craigen, James M., Kirkton, Balblair.

1911 Oran, David R., Ardmore, Edderton.
 1911 Davidson, Duncan, of Tulloch, Dingwall.
 1911 Duncan, Arthur H., Solicitor, Dingwall.
 1912 Fraser, Alexander, Ord Distillery, Muir of Ord.
 1911 Fraser, James, Knockancurin, Evanton, Ross-shire.
 1912 Fraser, W., Udale, Poyntzfield, Invergordon.
 1911 Gair, Wm. A., Ballachraggan, Alness.
 1912 Gill, A. T., Rosskeen, Invergordon.
 1911 Gilroy, George, jun., Easter Moy, Urray, Muir of Ord.
 1911 Gordon, Alexander, Ord Distillery, Muir of Ord.
 1911 Grant, Walter S., Flowerburn Mains, Fortrose.
 1911 Hill, A. W., of Lemlair, Dingwall.
 1911 Jack, Alexander, Kinkell, Conon Bridge.
 1911 Kemp, Charles, Gateside, Munlochy.
 1911 Macdonald, James, Wester Urray, Muir of Ord.
 1912 M'Donald, John, Hilton, Portmahomack, Ross-shire.
 1911 Macdonald, Simon, Commercial Bank, Dingwall.
 1911 Macdonald, Wm., Kessock Hotel, North Kessock, Ross-shire.
 1911 MacFarquhar, John, Cullicudden, Conon Bridge.

1911 M'Hardy, Alaster, Braemore, Garve, Ross-shire.
 1911 Mackintosh, A. A., Croftcrumie, Tore, Ross-shire.
 1911 M'Intosh, William, Tarradale Hotel, Muir of Ord.
 1911 M'Intyre, P. B., jun., Findon Mains, Conon Bridge.
 1911 Mackenzie, John, Balnain, Conon Bridge.
 1912 M'Lennan, Wm. Hugh, Springfield, Cullicudden, Conon Bridge.
 1911 Mann, John, Bog of Aughterflow, Munlochy.
 1911 Matheson, Thomas, Craiglands, Fortrose.
 1911 Middleton, Frank A., Rosefarm, Cromarty.
 1911 Munro, Major C. L. D., of Allan, Fearn, Ross-shire.
 1911 Morrison, William, Gledfield Home Farm, Ardgay, Ross-shire.
 1911 Munro, Alexander, Arkendeith, Avoch.
 1911 Rattray, Hugh, Wester Arboll, Fearn, Ross-shire.
 1911 Robertson, W. L., Invercharron Mains, Ardgay.
 1911 Stirling, Capt. A., of Strathgarve, Garve.
 1911 Thomson, James F., Castleton, Avoch.
 1911 Urquhart, John, Ironmonger, Dingwall.
 1911 Walker, Robert, Contullich, Alness, Ross-shire.
 1911 Wight, Evan, Victoria Terrace, Tain.
 1912 Wooley, Thomas, Royal Hotel, Tain.

SUTHERLAND.

1911 Anderson, Andrew, General Merchant, Bonar Bridge.
 1911 Grant, Alick, Evelix, Dornoch.
 1911 Hunter, F. M., Sutherland Wool Mills, Brora.
 1912 M'Lennan, A. F., Cyderhall, Dornoch.
 1911 Menzies, James, Blairich, Rogart.

1911 Mitchell, James, Ribigill, Tongue.
 1911 Rose, John C., Coul, Skibo, Sutherland.
 1911 Stafford, Marquis of, Dunrobin Castle, Golspie.
 1911 Stuart, Peter, Clynelish, Brora.
 1911 Wilson, James, Fulrossie, Dornoch.

8.—BORDER DISTRICT.

PEEBLES.

1911 Daniell, C. Leaf, of Earlyvale, Eddleston.
 1912 Laidlaw, William, Kingsmeadows, Peebles.
 1912 Lorimer, H. D., Callands, West Linton.

ROXBURGH.

1911 Cox, Thomas H. C., Lochside, Kelso.
 1911 Cuninghame, William John, Courthill, Kelso.
 1911 Hay, Robert Athole, Marfield, Roxburgh.

SELKIRK.

1912 Elliot, John, Blackhaugh, Clovenfords.

ENGLAND.

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 1912 Arnold, Edwin Ross, 5 and 6 Gillspur Street, London, E.C.
 1912 Gleaholme, W. J., Little Haughlin, Lesbury.
 1911 Harrison, Thomas Darwell, Leigh, Lancashire.

1911 Medlock, Fred. W., M.R.C.V.S., 4 Whitehall Place, London.
 1912 Roberts, H. E., Monkcastle, Southwaite, Carlisle.
 1912 Taylor, Neill, General Manager, H. R. Marsden, Ltd., Soho Foundry, Leeds.
 1912 Tonks, A. G., St Margaret's, Rochester.

THE COLONIES.

1911 Dickson, R. H. Bruce, Department of Agriculture, Salisbury, South Rhodesia, South Africa.

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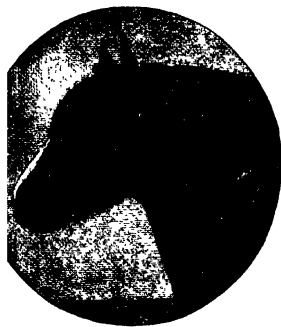
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